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A TECHNICAL AND ECONOMIC STUDY OF WASTE OIL RECOVERY.

PART I: FEDERAL RESEARCH ON OIL FROM AUTOMOBILES

TEKNEKRON, INCORPORATED

PREPARED FOR
ENVIRONMENTAL PROTECTION AGENCY
INSTITUTE OF PUBLIC ADMINISTRATION

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A TECHNICAL AND ECONOMIC STUDY OF WASTE OIL RECOVERY

Part I: Federal Research on Waste Oil from Automobiles

This report (SW-90c.1) was written by
PETER CUKOR, MICHAEL JOHN KEATON, and GREGORY WILCOX
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A Technical and Economic Study of Waste Oil Recovery - Part I: Federal Research on Waste Oil From Automobiles

A Technical and Economic Study of Waste Oil Recovery - Part II: An Investigation of Dispersed Sources of Used Crankcase Oils

A Technical and Economic Study of Waste Oil Recovery - Part III: Economic, Technical and Institutional Barriers to Waste Oil Recovery

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1.0 INTRODUCTION AND SUMMARY

1.1 Introduction

As with many other problems of national importance, concern over the environmental effects of the disposal of used automotive crankcase oil has spawned a variety of research projects in a number of agencies of the federal government. In addition to the obvious participation of the Environmental Protection Agency, the Departments of Defense, Interior, Commerce and Treasury, the General Services Administration, the Federal Trade Commission, the Postal Service, the White House and the Congress have all been involved to a significant degree in efforts concerned with finding solutions to the waste oil disposal problem. Unfortunately, there is little coordination of these efforts amongst the agencies involved and even within an agency there is a tendency for inadequate communication regarding ongoing research activities. It is apparent that time and money could be utilized more efficiently if those concerned with research on waste oil disposal could be made aware of the scope and direction of similar projects in the various branches of the government.

This report seeks to achieve this goal by identifying and describing in some detail current and recent federal investigations related to the waste oil problem. By drawing together disparate strands of information concerning waste oil research programs, it is possible both to avoid duplication of effort and to guide future strategy. Through extensive conversations with project officers and contractors, a list of federal research programs concerned with the disposition of waste oil from automobiles has been compiled. A summary of these efforts is presented in Table 1.

Appendix C to this report consists of an annotated bibliography covering a very wide range of publications which have resulted from federal research efforts on used oil disposal. In addition, the bibliography contains references to a number of reports prepared by organizations outside of the federal government. Information contained in these reports bears directly on current studies being carried out by federal agencies. By providing abstracts of relevant publications, it is possible to locate and analyze efforts already performed upon whose results broad federal policy concerning waste lube oil disposal and future research programs can be based.

1.2 Summary

The material in this report is summarized in Table 1. Two sets of conclusions can be drawn by examining the entries in the table - one by reading down the columns and the other by reading across the rows. The columns, which represent different functional cuts at the waste oil problem, show that three elements have received little attention by interested federal agencies. First,

there has been little research on the environmental impacts of various waste oil disposal practices. EPA has been the sole supporter of work in this area, and even its projects have received a relatively low level of funding. Data on this element of the waste oil problem is crucial because knowledge of the environmental damages resulting from waste oil disposal permits the determination of the cost-effectiveness of research directed at this particular pollutant.

Second, federal research efforts have failed to analyze the economics of today's re-refining industry. Although there has been no lack of economic evaluation of new re-refining technology, no study of the existing industry as an economic system has been made. Obviously, any federal efforts to encourage recycling of waste oil cannot be effective with such an overview. Part III of the present study provides the first quantitative analysis of the economics of the re-refining industry as it exists today.[1]

Thirdly, little or no effort has been directed toward the establishment of an overall national policy on waste oil -- both from pollution control resource conservation viewpoints. Two modest EPA studies are the only federal efforts now being made in this area. It is hoped that this analysis of federal waste oil research activities may be a beginning step in developing a rational and coordinated federal policy on the dispostion of this valuable resource.

Reading across the rows shows the activities of the many federal agencies with an interest in waste oil disposal. The Defense Department and the Environmental Protection Agency are the leaders in research on this issue. The Military's involvement has resulted both from its role as the nation's largest consumer of lube oil and producer of waste oil, and from its responsibility for establishing quality specifications for and for actual procurement of lube oils required by all federal agencies. Several other federal agencies are also involved because they, too, are large customers of lube oil. These groups include the General Services Administration, the Department of Agriculture and the Postal Service. The involvement of several other agencies has been related to their normal functions, such as the Treasury Department, which has interpreted the excise tax liability of buyers and producers of lube oil and the Federal Trade Commission, which is now reconsidering the labelling requirements for re-refined oils. Agencies which have the potential to become major participants in forming new policies on waste oil, such as the Department of Commerce and the National Science Foundation, have also reviewed problems related to the disposal and recovery of waste oils.

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1 "A Technical and Economic Study of Waste Oil Recovery - Part III: An Analysis of Economic, Technical and Institutional Barriers to Waste Oil Recovery;" Teknekron, Inc.; EPA Contract No. 68-01-1806; October 1973.

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	[illegible]	TREATMENT TECHNOLOGY	[illegible]	[illegible]	[illegible]	ECONOMIC OBSTACLES	PROGRAM REVIEW	MATERIAL POLICY	KEY UNIT	KEY CONTACT	COMPLETION DATE	PLANNED SPECIAL FUNDING ($000)	PROJECT [illegible]
White House							X	X	Council on Env. Quality	Steffan Plaine	Task force Dec 1970	None	--An interagency task force study of regulations in federal waste oil policy. No recommendations resulted. Pollution damage from disposal and the quality of alternative product uses could not be demonstrated
Congress [illegible]								X	House Ways and Means	Cong. Chas Vanik (D-Ohio)	---	Revenue: $75 million per year Expenditure: $45 million per year	--A comprehensive bill to retrieve waste oil pollution and conserve resources. It would reform excise taxes, change IRC labeling rules, encourage federal procurement practices, support research, mandate returnable containers, and require adequate collection facilities
[illegible]								X	Senate Air and Water Pollution Subcommittee	Sen. Edmund Muskie (D-Maine)[2]	Interim April 1973 Final April 1974	$100 million/year authorized for this study and others.	--Section 104(b) of the Federal Water Pollution Control Act Amendments of 1972 [illegible] provides for an EPA study of waste oil. Present disposal practices, biological hazard, and future possibilities for use
[illegible]							X		Resource and Economic Development Division	J. Gayle Donahue	October 1973	$25,000	--An exploratory survey of a few federal facilities to determine what is currently being done with waste oil and whether profitable disposal alternatives exist
[illegible]		X	X						National Bureau of Standards	Thomas Myers	Letter Circular, August 1960	None	--A short review of re-refining processes and problems
Defense 1 [illegible]		X	X				X		Defense Fuel Supply Center	Dr. John A. Brynitsky	1975, Proposal, not yet formally approved	More than $450,000	--A three part project: 1) to increase military purchase of certain waste oil products, 2) to test ashless oil as a blended fuel oil, and 3) to set military specifications for re-refined lube oil. To be carried out by DSA and Army Materiel Command
2 Navy, [illegible] and [illegible] Laboratory	X	X	X				X		Aberdeen Chemical and Coating Laboratory	Harry L. Hamburg	Summer 1973	None	--An internal study of using waste oil as a blended fuel oil, stack emissions and boiler operation were examined
3 Navy, Fuels and Lubricants Laboratory									Fuels and Lubricants Engineering Section	Sidney Lestz	First Phase Completed. Second Phase to be completed by end of 1973	$50,000	--Tests to determine the feasibility of plasticizing automobile oil changes entirely. The technique is to seal the crankcase and increase both oil burning and additions
4 Navy	X						X		Naval Supply Systems Command	Ronald M. Jernejcic	June 1973	$275,000	--A contract with Esso Research and Engineering Company to develop plans for disposal of all oily wastes at nine major Navy terminal complexes.
5 Air Force	X	X	X				X		AF Environmental Protection Group	Col. Herbert E. Bell	Fall 1973	$80,000	--Two contracts with Esso Research and Engineering: a paper study of alternative waste oil disposal techniques, and field testing of waste oil as fuel oil
Environmental Protection Agency 1 NERC		X	X		X				Office of R&D, National Environmental Research Center (Cincy)	Dr. Peter B. Lederman	April 1975	Grant: $338,000, 1960 Contract: $152,000, 1971	--A major technological study to develop a low pollution process for turning used lube oil into useful products, especially fuel oil and diesel. Carried out by the National Oil Recovery Corporation (NORCO)
2 MES	X	X	X		X				Office of R&D, National Environmental Research Center (Cincy)	Dr. Peter B. Lederman	June 1973	Grant: $140,000, 1972 Additional: $42,000 1973	--A grant made to the Maryland Environmental Service (MES) to develop a comprehensive collection and treatment plan to solve the state's waste oil problems. Contract let to Environmental Quality Systems, Inc

3 GSA		X	X		X				Office of Research and Development	First Contract Award Johnston Second Contract Dr John A Jossis	First Contract June 1973, Second Contract Dec 1973	First contract $29,500 Second Contract $50,000	--Two projects on the economic and technical feasibility of using waste oil as a blended fuel with the first one to investigate its characteristics, the second one to identify power plants capable of burning waste oil in their area
4 Tennessee	X				X		X	X	Office of Solid Waste Management Programs	Dr John H Skinner	Sept 1973	Contract $50,000	A study of the feasibility of setting up a "closed loop" oil disposal and processing system using re-refined waste oil as the oil. Investigation consists of identifying sources of waste crankcase oil, collecting and analyzing samples of waste oil, and making recommendations to the Tennessee Air Pollution Control Board and the Tennessee Institute of Public Administration
5 Allen Systems	X	X		X					EPA's Edison Water Quality Laboratory	Leo McCarthy	October 1973	Contract $40,000	A study with two main objectives: 1) to find a low cost available waste oil re-refining process and study environmental impact and 2) to measure the magnitude of the waste oil problem by developing a materials balance survey program for selected waste oil generation areas
6 GSI						X		X	Office of Research and Development	Dr John A Jossis	April 1974	Contract $50,000 (For waste oil and other studies)	A study of federal policies on waste oil, including recommendations for short and implementation plans
7 In House and Past Studies		X		X					Office of Environmental Sciences	Dr David Rhumstad	Dec. 1972	In House $80,000 for ecological studies	--In-house studies of long term biological effects of waste oil on the aquatic environment. Past studies of ground disposal of waste oil, protection of ship vessels and oil cultivation processes for oily waste disposal
Federal Trade Commission			X			X	X		Bureau of Consumer Protection	Raymond Rothe	Staff Report, Dec. 1973	None	--Reconsideration of tough labeling requirements currently in effect for re-refined oil, consideration of criteria for acceptable use of term, "recycled"
General Services Administration	X		X				X		Environ. Affairs	Andrew E. Masters	Oil Survey, June 1973	None	--Survey of waste oil generation from GSA motor vehicles serviced in house, examining fuel use and other economic disposal methods
Interior Department		X	X				X		Bureau of Mines	Richard M. Gooding	Oil Recycling Study, 1972	About $1,600,000	--A major technical study to develop and demonstrate waste oil re-refining methods. Carried out by the Energy Resource Center in Bartlesville, Oklahoma
Postal Service									Office of Fleet Maint.	Morton Culver	No research in progress	None	--Long standing general guidelines for non-polluting disposal of waste oil, but no plans for further study of policy change
Treasury Department						X	X		Tax Policy Division	John Copeland	Rev. Ruling, 1965	None	--Interprets excise tax liability of lube oil producers and buyers, has no plans to revise older post decisions or ask for statutory changes
Transportation Department	X								Office of Research	Richard Strombotne	"Oil Pollution" 1968	None	--Cited automobile as a waste oil source in 1968 report, although the Coast Guard has an active oil spills program, no further DOT work has been done on auto sources
Department of Agriculture									Office of Plant and Operations	E.H. Boyer	No research in progress	None	--The U. S. Department of Agriculture has no waste oil research planned or in progress
National Science Foundation									Division of Environmental Systems and Resources	Edward H. Bryan	No research in progress	None	--Studies are being carried on in related areas

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[1] Other waste oil bills of lesser importance have also been introduced

[2] Senator J. Caleb Boggs (R-Del.), author of this provision, was not returned to the Senate in 1972.

2.0 WHITE HOUSE

Just after its creation in 1970[1], the White House Council on Environmental Quality (CEQ) put together an inter-agency task force to study the need for new federal policy on waste oil disposal. However, the CEQ staff shelved the issue following a preliminary evaluation of the expected problems and probable benefits. Since that time CEQ has done very little on waste oil and has no plans to revive the issue in the near future.

CEQ was discouraged from developing new waste oil policy for two reasons: product quality and environmental impact. In the area of product quality, it could not get adequate technical data on the quality of re-refined lube oil, and the data that was available appeared to show that re-refined oil was frequently inferior. In particular, the complete removal of additives from waste oil seemed to be extremely difficult. As for environmental impact, CEQ could not get any evidence that current waste oil disposal practices were causing significant damage. With damages unclear and no promising alternative use for waste oil, it was felt that compared to other pollutants waste oil did not merit the effort required to deal with it.

Although the CEQ task force effort was scrapped, the investigation resulted in a CEQ request to the Defense Department to look into the use and possible procurement of reprocessed lube oil. This request eventually led to a proposal by the Defense Supply Agency to conduct a major study of re-refined oil[2].

Staff responsibility for the issue of waste oil disposal has shifted several times since CEQ's creation. William Matuszeski was the staff assistant in charge when the 1970 inter-agency task force was active. The FTC, GSA, Bureau of Mines, Treasury Department, and EPA were included in the discussions. Responsibility was then shifted to Eric Zausner and recently to Steffen Plehn, who now has responsibility for the files developed during CEQ's past waste oil investigations. Last fall, Plehn made a brief review of developments in the field, but decided that the situation had not changed enough to warrant renewed CEQ interest. The product quality and environmental impact issues continue to be seen as major obstacles.

3.0 CONGRESS

Congress is the source of much of the increasing interest in waste oil. It has mandated a thorough EPA study of waste oil and has raised many of the issues and new policy ideas now being widely considered. In addition, the General Accounting Office recently began a survey of waste oil disposal practices at federal facilities.

3.1 Statutes[3]

The most important recent enactment concerning research on waste oil was the passage last fall of amendments to the Federal Water Pollution Control Act[4]. Section 104(m) directs EPA to study waste oil: present disposal practices, biological impacts, and future possibilities for use. Preliminary results of EPA's study were reported last April[5] and final results are required by April 15, 1974.

The waste oil study provision was written into the law largely at the insistence of Sen. J. Caleb Boggs (R-Del.) who had been concerned with the issue since 1967[6]. However, Sen. Boggs was not returned to the Senate in the 1972 election, and the Senate lost its leading proponent of improved waste oil disposal practices.

3.2 Bills

In the House, Congressman Charles A. Vanik (D-Ohio) has led the crusade on waste oil but so far has failed to get his proposals enacted. This year he introduced a comprehensive bill, the "National Oil Recycling Act", to control waste oil pollution and conserve resources.[7] A major provision of the bill would reform the excise tax treatment of lubricating oils by abolishing the current tax exemption enjoyed by virgin lube oil that is not used in highway vehicles. The bill would also change the labeling requirements for re-refined oil imposed by the Federal Trade Commission, prohibit oil companies from restricting their service stations from selling recycled oil, encourage Federal procurement of recycled oil, and force all lube oil retailers to provide disposal facilities and to sell only in returnable containers.[8]

Many of the provisions in Vanik's bill are similar to provisions in other bills either now pending in Congress or introduced in the past. Bills to reform the excise tax treatment of lube oils were introduced in the Senate this

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year by Senator Strom Thurmond (R-S.C.)[9] and in the House by Congressman Joseph P. Vigorito (D-Pa.)[10]. These measures would allow re-refiners to be exempted from payment of excise taxes on virgin oil that they buy to blend with their re-refined oil[11]. A bill to exempt lube oil, that meets certain performance specifications, from burdensome FTC labeling regulations was introduced by Sen. Boggs in 1968[12]. No action was taken.

3.3 General Accounting Office

The General Accounting Office (GAO), an agency of the U. S. Congress, began an exploratory survey of waste oil disposal by federal facilities in July 1973. Some $25,000 will be spent to conduct, and analyze the results of, staff visits to federal facilities in a specific region of the country. The objective is to evaluate the need for a broader national study which would result in a formal report to Congress. The survey will attempt to determine what is currently being done with waste oil and whether preferable disposal alternatives exist. The results of the survey should be available by October, and a decision on a full-scale, nation-wide review is expected soon thereafter.

The GAO survey grew out of the agency's past review of EPA's implementation of the Solid Waste Disposal Act. Recent interest in energy supplies and oil imports led GAO to consider an examination of waste lube oil. The project was undertaken on GAO's own initiative and not at the direction of Congress.

For administrative reasons, the work will be directed from the GAO Seattle regional office. Field investigations will be limited to two states, Washington and Oregon, and to three federal agencies, Defense, Postal Service, and General Services Administration. However, since the survey is meant to be exploratory, other agencies and states may be included if the problem or potential solutions appear to be outside the original boundaries. Of the 200 man days alloted to the project, 150 will be spent in Seattle and 50 for the project review in Washington, D. C.

J. Kevin Donohue, an Audit Manager in the Resource and Economic Development Division of GAO, has overall responsibility for the waste oil disposal survey. John McNamara in the Seattle regional office is the project officer.

4.0 DEPARTMENT OF COMMERCE

The Commerce Department's National Bureau of Standards (NBS) was once active on the issue of waste oil re-refining but has done nothing on the topic in the recent past and plans no action in the future. Twice in the last six years, there have been tentative plans to have NBS test the quality of re-refined oils, but neither attempt went past the talking stage. NBS no longer has the facilities nor expertise to evaluate the quality of lubricating oils.

NBS published a letter circular in August 1950 entitled "Re-Refining Used Crankcase Oil"[13]. The three-page report concluded that the quality of re-refined oil depends upon the quality of new oils from which it is obtained, the extent of deterioration, and the re-refining process. It admitted that NBS did not have adequate test data to support any statement on the relative performance of new and re-refined oils. The Automotive Section of NBS was abolished in the early 1950's and the Fuel Section in 1960.

In 1967, as a result of hearings on waste oil that year[14], Senators Magnuson, Muskie, and Boggs wrote to the Department of Commerce (DOC) asking that NBS perform quality tests on re-refined oil. DOC requested $300,000 for the task but the request was rejected by the Bureau of the Budget.

In 1970 the Federal Trade Commission (FTC) queried NBS on the quality of re-refined oil. The FTC had promised to reconsider its labeling restrictions in the light of new data on product quality during its participation in a CEQ waste oil task force[15]. NBS told the FTC at that time that it was unable to supply any information.

5.0 DEPARTMENT OF DEFENSE

The Defense Department has sponsored two major waste oil studies. The first is a Defense Supply Agency program to search for ways to increase federal purchases of products made from used oil. The second is a series of plans for the Navy Supply Systems Command for disposal of oily wastes at Naval facilities. In addition, the Army Materiel Command and the Air Force are pursuing small independent studies of waste oil as a fuel.

5.1 Background

The military's waste oil policies have a strong influence on all other federal agencies and on much of the private market. The Defense Department (DOD) is the nation's largest and most careful buyer of vehicle lube oil and its largest producer of waste oil. Its specifications for lube oil quality are followed by many state, local, and commercial fleet maintenance facilities.

Even more important, the General Services Administration(GSA) has delegated authority to the Defense Supply Agency (DSA) to procure fuel and lubricants for the entire federal government[16].

The military's great influence in the lube oil field has meant that its views have a major impact -- and it has taken a very dim view of the quality of re-refined oil. DSA buys lube oil for the military and other federal agencies according to specifications written by the Army Materiel Command's Coating and Chemical Laboratory at Aberdeen Proving Ground in Maryland. These specifications exclude the use of previously used materials such as re-refined oils on the grounds that there is no reliable information on the quality of such oils[17]. According to DSA, the small, independent firms which typically engage in oil re-refining do not have the financial capability to support the kind of laboratory and other testing needed to provide essential data on quality and consistency.

DSA believes that the quality of re-refined stocks may be affected by two factors: treatment method and waste oil composition. As for treatment method, there is concern that the acid frequently used to remove contaminants may also remove naturally present inhibitors and lubricating components. Re-refiners dispute this opinion but have not been able to show convincing data to the contrary.

The variation in the source of used oil presents an even tougher problem. Vehicle lube oils are currently procured for the government only after they have passed an extensive series of qualifying engine tests costing between

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$10,000 and $80,000. Once an oil is qualified, the supplier is required by contract not to change his additive package, his refining method, or his source of crude oil. Of course re-refiners who get their waste oil from service stations and other scattered sources have little control over the quality of their feedstock and have no hope of entering into such a contract. DSA believes that most of the re-refiners could not afford even one set of qualifying tests, let alone a set of tests for each new batch of re-refined oil produced.

5.2 Projects

DSA, as the central purchaser of military supplies, is mainly concerned about the quality and cost of new lube products, while the individual services are more concerned with how to dispose of their waste oils without running afoul of pollution regulations.

(1) Products from Waste Oil: DSA

In September of 1972, DSA issued its proposal for a research effort on waste oil disposal, "Waste Oil Recycling Study"[18]. The proposal and a background report were prepared at the request of Deputy Assistant Secretary of Defense for Health and Environment, John A. Busterud. Although Busterud reportedly liked the proposal, he left to join the Council on Environmental Quality before any action could be taken. The proposal then went to the Department of the Army for evaluation in early 1973, but has not yet been either approved or disapproved.

The proposal makes the following recommendations:

- Take steps to acquaint members of the re-refining industry with various petroleum products procured by the government that are not restricted to virgin base stocks.

- Initiate research to determine the physical characteristics of waste oil generated by vehicles operating on unleaded gasoline and low-ash oil; choose a military installation to demonstrate the feasibility of utilizing the crankcase drainings as a heating fuel.

- Start a study to develop specifications for an automotive lubricating oil containing available re-refined stocks.

DSA itself proposed to do the first task and has already contacted lube oil re-refiners. On the other hand, the DSA proposal gives the U. S. Army Materiel Command (USAMC) the primary responsibility for the remaining two tasks because the USAMC has both the final authority to write motor oil specifications and the laboratory facilities to do the necessary technical work. Although the proposed DSA study tasks have not been formally approved

and assigned, the USAMC has begun preliminary work on the project under its general research authority in this area.

The first task recommendation, procurement of unrestricted re-refined products, is thought to be a short term way of assisting the beleaqured re-refining industry. DSA points out that of the 210 lube products handled by the Defense Fuel Supply Center (DFSC), about 200 do not prohibit the use of re-refined materials. The DSA suggests that the re-refiners' lack of knowledge of quality requirements and procurement procedures may be a problem and that a single education program is the answer. Nevertheless, DSA also acknowledges that nearly half of the volume of lube oils procured by DFSC are restricted to virgin stock. Therefore such procurement cannot be a long-term solution to waste oil problems however much it may assist individual re-refiners.

The second task recommendation, an investigation of non-metallic waste oils, is an attempt to evaluate the use of waste oil as fuel from the standpoint of expected changes in oil composition over the next few years. DSA suggests that planned environmental restrictions on lead in gasoline and likely environmental restrictions on metallic additives to lube oil will produce ashless oil that can be burned without causing air pollution. The DSA proposal recommends that performance of lead-free gasoline and low ash content lube oils be demonstrated at a particular military installation, that the resulting waste oil be blended with fuel oil, and that the emissions and burner operation of the mixture be monitored.

The last task recommendation, development of military specifications for re-refined lube oils, is the most difficult and DSA has requested extra resources to carry it out. The proposal calls for a three-year effort, three full-time personnel, and an additional $150,000 per year for laboratory support and engine testing.

In carrying out the study, DSA plans to identify all re-refiners and collect re-refined base stock samples from their USAMC laboratory analysis. The analysis is to determine the physical characteristics and quality variations of re-refined oils now on the market. The variations in batches resulting from different waste oil sources, treatment methods, and seasonal changes will be of special interest. It is proposed that the Bureau of Mines help in the work. Once allowable parameters for re-refined oils are established, the USAMC will attempt to develop simple laboratory tests for monitoring lube oil characteristics so that consistency can be assured. Appropriate additive packages will be combined with the re-refined stocks and performance will be measured with a series of engine tests. If 100 percent re-refined oils are found to be unqualifiable, the USAMC will test various blends of virgin oil and re-refined oil until a qualifying mixture can be specified. Finally, it is proposed that a military installation demonstrate the performance of the newly specified oils over a 12-month trial period.

Mr. Harry Ammlung, Director of the USAMC's Coating and Chemical Laboratory in Aberdeen, Maryland, would have overall responsibility for the parts of the

DSA project involving fuel tests of ashless waste oil and specifications for re-refined oil. Mr. Charles F. Schwartz and Mr. E. LePera of Aberdeen would have the chief operational responsibility. Mr. Jan B. Reitman, of DSA's Field Support Division, drafted the original DSA proposal with the assistance of Dr. John A. Krynitsky of the Defense Fuel Supply Center's Office of Technical Services.

(2) Waste Oil as Fuel: AMC Coating and Chemical Laboratory

The Army Materiel Command has its own ongoing project involving waste oil disposal. Since September 1972, the USAMC's Coating and Chemical Laboratory has burned 40,000 gallons of waste oil as fuel using a 5% - 10% blend with No. 2 virgin fuel oil The project is a small, informal one requiring no funds. Stack emissions have been measured before and after introduction of waste oil. Although no numerical data has been released as a result of the test, USAMC has found neither excessive emissions nor boiler fouling. Staff from nearby Edgewood Arsenal are helping to monitor emissions. The USAMC is now considering a recommendation that other Army installations use this method of disposal.

The USAMC's study of waste oil as fuel began largely as the result of an order in 1972 from the USAMC's Troop Support Division which banned ground dumping, including the use of waste oil for dust control. Disposal was limited either to selling, paying for collection, or burning. Open burning is not allowed and there have not been enough incinerators to destroy the waste oil. Moreover, in many areas re-refiners could not readily be found to collect it. As a result, waste oil has been collecting at Army posts, camps, and stations across the country.

In an attempt to control the unwanted stockpiling of waste oil, USAMC has informed all Army facilities of the location of nearby re-refiners. If this proves inadequate, USAMC plans to meet with the Association of Petroleum e- efiners to see what can be done to increase collection services. In the meantime, the Army has collected data on waste oil types, quantities, and locations at its installations, but has not analyzed the information. It is hoping that the USAMC tests of waste oil for fuel will provide a way to reduce its increasing waste oil stockpiles.

(3) Elimination of Waste Oil Generation: USAMC Army Fuels and Lubricants Laboratory

The Army Materiel Command is trying yet another solution for waste oil disposal problems: non-generation. The USAMC's Army Fuels and Lubricants Laboratory in San Antonio, Texas, is running tests to determine the feasibility of eliminating automobile oil changes entirely. The project is costing in the neighborhood of $50,000 and will be completed by the end of 1973. The first phase, lab tests, were begun early this year and have been completed. The second phase, "fleet testing", will start in fall 1973. In this phase, military jeeps will be driven 20,000 miles with sealed crankcases.

The Army's rationale for the program is that the deterioration of lube oil can theoretically be counterbalanced by the quality, frequency, and amounts of make-up oil added to replace the old lube oil burned in the engine. If enough fresh, high quality lube oil can be put in the crankcase to dilute the dirty used oil, then the overall quality of the lubricant can be kept at an acceptable level. However, the only way to provide enough room for the amounts of new oil required is to increase the burning of oil in the engine -- contrary to the usual objective of decreasing engine oil burning. The Army estimates that an average engine in good condition and using clean fuels would need to burn up about a quart of oil every 1100 miles to allow enough new oil to be added. It warns, however, that under more typical conditions, the burn rate would have to be higher since service station fuel is not particularly clean and fuel contaminants are a major cause of lube oil deterioration.

The Army Fuels and Lubricants Laboratory argues that the automobile engine may be an excellent incinerator for used lube oil. Since the Army feels that the most practical use of waste oil may be as fuel anyway, it reasons that expensive handling can be eliminated by recovering the fuel value within the automobile engine. An attempt will be made to compare the air pollution and other environmental impacts of this burning method with other more conventional methods. The Army Laboratory will also investigate what this approach implies for engine design and wasteful increased burning of fresh new oil.

The project leader is Sidney Lestz, Manager of the Laboratory's Fuels and Lubricants Engineering Section. Roy D. Quillian directs the Laboratory and reports to Harry L. Ammlung, Director of the Army's Coating and Chemical Laboratory in Aberdeen, Maryland. The USAMC's Fuels and Lubricants Laboratory uses facilities owned by the Southwest Research Institute.

(4) Disposal of Oily Wastes: Navy

In March 1972, the Research and Development Branch of the Naval Supply Systems Command (NASUP) let a contract for $275,000 to Esso Research and Engineering Company to develop plans for disposal of all oily wastes at nine major Navy terminal complexes[19], including Marine Corps facilities. Used motor vehicle lubricants are included, but represent only a small percentage of total Navy oily wastes. NASUP estimates that with the Esso plan, 98% of oily waste will be reclaimed as fuel[20], the remaining 2% going to landfill. All research is now completed and reports were due in by June 25, 1973. The Navy hopes to receive an appropriation in fiscal 1975 for construction funds to implement the plans.

At each of the nine locations, Esso's scope of work required these tasks:

- An estimation of the quantity, quality and location of all oily wastes, both ashore and afloat.

- Explicit consideration of a wide range of solutions and designation of the most cost-effective.

- Design of an implementable area-wide system for collection, processing and sale of oily waste for fuel.

- Finding ways to have private industry solve the problem, or short of that, to have other government agencies cooperate; as a last resort the Navy would go into the disposal business by itself.

Although the plans have all been completed and many have been submitted for approval, revisions will be needed to take into account recently announced base closings, such as the operations shift from Long Beach to San Diego. It is not anticipated that the revisions will significantly retard implementation since the adjustments will be relatively minor and can be made while reviews are proceeding.

The impetus for the Navy oily waste program goes back to 1970. In June of that year Congress passed the Water Pollution Control Act calling for a cessation of oil dumping at sea. In a November NATO meeting, the U. S. introduced, and won, a resolution that by mid-decade all NATO nations should achieve a complete halt of international discharges into the sea. The only alternative was development of extensive shore facilities to dispose of the oil.

The federal project officer for the Esso study is Donald H. Jermain of NASUP's Research and Development Branch. Commander Joseph D'Emidio, Director of the Navy's Environmental Protection Division, has overall responsibility for Navy waste disposal activities.

(5) Waste Oil as Fuel: Air Force

The Air Force has awarded two waste oil research contracts to Esso Research and Engineering Company. The first contract is for $39,000 and calls for Esso to perform a paper study of alternative techniques that the Air Force might use in disposing of waste petroleum, oils, and lubricants (POL's)[21]. The study is to be completed by the end of October and the final report released soon thereafter. The second contract is for $41,000 and provides for actual field testing of one of the alternative techniques being analyzed in the first contract: use of POL's as fuel[22]. It is to be completed by the end of August 1973.

The objective of the first study is to identify alternative POL disposal techniques and to recommend criteria that Air Force installations, in different circumstances, can use in choosing among these techniques. The criteria will include the amounts and kinds of POL's generated, nearness of the installation to purchasers, local air quality and so forth. The Air Force has some data on the kinds and amounts of POL's generated at its bases and has supplied the information to Esso. Esso will analyze this data along with available disposal technology and make specific recommendations on optimal disposal approaches at specific facilities. Esso has a general preference for fuel uses but project supervisors feel that their technical review is capable of catching any biases in this direction.

The objective of the second study is to test the feasibility of burning POL's as fuel, blended either with fuel oil or natural gas. Both heavy and light POL's are to be tested, but waste crankcase oil has been excluded from the experiments on the grounds that there is already sufficient experimental data on its use as fuel. Solvents, contaminated fuels, and synthetic aircraft oils will be the primary focus. The short-term nature of the study will not allow burner fouling or air pollution to be studied extensively. Instead, blending ratios, fuel concentrations, and similar process variables will be examined.

The two contracts are being monitored by the Air Force Weapons Laboratory at Kirtland Air Force Base, New Mexico. Kirtland has service-wide responsibility for environmental engineering and research development. Lt. Ronald H. Kroop, an environmental engineer in the Environics Branch of the Laboratory, is the project officer for both studies.

At Air Force Headquarters in Washington, Col. Herbert E. Bell, Chief of the Air Force Environmental Protection Group, has overall responsibility for supervising waste oil disposal research and policy development. Col. John Thompson, an environmental engineer, has the chief staff responsibility. The second Esso contract on fuel uses came as a direct request from this group.

Air Force Headquarters indicates that waste oil is currently building up at the service's bases because opportunities for disposal have diminished. Waste oil disposal practices vary widely from base to base, but none presently participate in any "closed-loop" re-refining system. Some of the oil is still being used for dust control. Headquarters is doubtful that either fuel use or fuel recycling to lube oil will provide a long-term solution to waste oil disposal. Instead, it believes that reprocessing of waste oil to other petroleum products, such as the diesel fuel produced by NORCO[23], is the best solution. Futhermore, it believes that the Air Force should be part of a much larger national system of waste oil collection and reprocessing.

6.0 ENVIRONMENTAL PROTECTION AGENCY

6.1 Interest and Background

The Environmental Protection Agency (EPA) is the most active organization in the federal government's search for solutions to the waste oil problem. EPA's interest is motivated by three concerns:

- Pollution caused by waste oil disposal

  Most of the waste oil generated in this country is dumped either in sewers or on the ground, and both methods cause severe water pollution. On the other hand, incineration or use as a fuel is likely to cause significant air pollution.

- Pollution caused by waste oil treatment

  Re-refining of waste oil and other treatment techniques result in ground and water pollution from acid sludges, spent clay, and other process residuals. Air pollution by noxious odors can also be a problem.

- Resource conservation

  Dwindling petroleum reserves and higher petroleum exploration costs make dead-end disposal of waste oil an increasingly short-sighted approach.

EPA's interest in waste oil has been both broadened and focused by recent amendments to the Federal Water Pollution Control Act[24]. The agency is called upon to report to Congress within eighteen months on a variety of waste oil issues. Several of these issues have not been emphasized in past EPA research, and a number of projects have recently been funded to yield the required information.

6.2 Organization and Personnel

The Office of the Administrator has assigned the Office of Research and Development (OR&D) the job of formulating EPA waste oil policy, producing the waste oil study mandated by Congress and of coordinating the additional EPA research needed to produce the study report. Kurt Jakobson of the Office of Environmental Engineering will gather and evaluate data required by Water

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Pollutions Act, Section 104(m), subparagraph A, the generation, nature, collection, disposal, and uses of waste oil. Dr. David Nyquist of the Office of Environmental Sciences will provide the information required by subparagraph B, long-term, chronic biological effects of waste oil in the environment. John A.Jaksch of the Implementation Research Division is responsible for subparagraph C on markets, federal procurement, and economic and legal factors.

Since other EPA units have an interest, and expertise, in waste oil problems, a working group has been formed to coordinate their inputs. In addition to the previously mentioned officials, the working group membership includes Dr. Peter Lederman of OR&D's National Environmental Research Center in Cincinnati; Thomas D. Clark of the Office of Solid Waste Management Programs; Cheryl Wasserman of the Office of Planning and Evaluation; Richard Hess and Donald Walters of the Office of Air and Water Programs; Kenneth Woodcock and Henry Stetina of the Office of Enforcement and General Counsel; and William Holmberg of the Office of Regional Liaison. Jakobson is chairman of the working group.

EPA's National Environmental Research Center in Cincinnati (NERC) is a technical arm of the Office of Research and Development and has funded technical studies of waste oil reclamation processes for several years. Dr. Peter Lederman, Director of the Center's Edison Water Quality Research Laboratory in New Jersey is supervising these activities. He will contribute to the working group in the area of waste oil generation and collection, and in the area of re-refining and fuel oil technology. Leo McCarthy, also of the Edison Lab, will report on the biological effects of waste oil burning.

The Office of Solid Waste Management Programs' Division of Resource Recovery has an interest in waste oil as a resource that can be recycled. Dr. John H. Skinner, Chief of the Division's Resource Recovery Analysis Branch, assigned Thomas D. Clark to supervise projects dealing with this issue.

The Office of Planning and Evaluation is interested in waste oil from the viewpoint of policy development and prospective legislation. Ms. Cheryl Wasserman, a member of the working group, works in the Policy Planning Division.

The Office of Air and Water Programs' Division of Oil and Hazardous Materials,under Kenneth E. Biglane,has an interest in waste oil as a potential water pollutant. Richard Hess is responsible for developing regulations, and operating programs, to prevent and mitigate the effects of oil spills. Donald Walters, in the Office of Air Programs, will advise the working group on the air pollution effects of waste oil burning.

The Office of Enforcement and General Counsel is to comment on possible enforcement actions that would result from any new legislation recommended. It will also assist in the interpretations of any existing legislation that regulates waste oils. Kenneth Woodcock is assisted in this

responsibility by Henry Stetina who will interpret state and local waste oil laws for the working group.

William Holmberg, Office of Regional Liaison, will review the working group's work and study recommendations from the perspective of EPA's regional offices to ensure that plans are administratively feasible.

6.3 Present Programs

EPA has stepped up its research efforts on waste oil and changed its focus in response to Congress's call for an EPA report. EPA has shifted its efforts from basic technical studies to practical evaluations of alternative comprehensive disposal strategies. In the past the agency has emphasized development of pollution-free disposal and treatment processes, whereas presently waste oil economics and federal policy options have become major concerns.

Most of EPA's research projects are being pursued under contracts let by the Office of Research and Development. The present study, however, is funded by the Office of Solid Waste Management Programs. The other EPA research projects are discussed below.

(1) Technology for Reprocessing to Fuel and Diesel Oil: NORCO

EPA's biggest investment in development of waste oil technology has been the NORCO study. In 1969 the National Oil Recovery Corporation (NORCO), a small company in Bayonne, New Jersey, received a $338,000 grant from EPA to develop a low pollution process for turning waste oil into useful petroleum products other than lube oils, particularly low sulfur heating oil and diesel fuel. The project was completed in 1971 and produced a report entitled, "Conversion of Crankcase Waste Oil into Useful Products"[25]. Soon afterward, EPA gave $352,000 more to NORCO for further research, this time in the form of a two-year contract[26].

Although NORCO scored some successes in the initial research project, a number of problems remained. The vacuum distillation process being evaluated produced No. 2 and No. 4 fuel oils that were low in sulfur and metals. It also produced some marketable lube stocks. Some experts, however, regard the technology as relatively antiquated[27]. The method avoided the use of acid and therefore eliminated the need for acid sludge disposal, but not all disposal problems were solved. Residual metals proved particularly hard to get rid of. When the grant expired, NORCO predicted that new and added equipment developed with the aid of continued EPA funding would result in 90 percent recovery of waste oil at lower cost without creating residual waste problems.

EPA has specified the following tasks in its current contract:

- Develop a treatment process unit to remove suspended colloidal and dissolved organic and metallic compounds either from the feedstock prior to

processing or from the products after processing in order to upgrade product quality. Higher level (No. 1 and No. 2) burner fuel is sought.

- Design and develop specifications for a bottom's incinerator or develop product outlets for the high metals content bottoms in order to preclude the discharge into the environment of these toxic materials.

- Conduct studies to determine the quality of products produced.

- Conduct various plant runs to obtain systems design and operating data.

In all, three different re-refining approaches are being evaluated: straight vacuum distillation, solvent extraction followed by distillation, and hydrotreating.

The NORCO project is being carried out under the supervision of EPA's Edison Water Quality Laboratory, a division of the National Environmental Research Center in Cincinnati. Richard Keppler, a research and development representative in EPA's Region I office (Boston), is the project officer. The contract is to be completed by the end of January 1974.

(2) Systems for Collection and Reprocessing to Fuel Oil: MES

In June 1972, EPA granted the Maryland Environmental Service (MES) $140,000 for development of a comprehensive collection and treatment plan to solve the state's waste oil problems. Maryland contributed $50,000 of its own funds and contracted with Environmental Quality System, Inc. (EQSI) of Rockville, Maryland, to perform most of the research. In July 1973, EPA made an additional $42,000 grant to MES to find out how to get rid of solid residuals in bottoms. MES will contribute about $8,000 of its own money.

Once plans are completed, MES will consider several options. It may attempt to interest private industry in an area-wide franchise or it may itself build a pilot waste oil processing plant. Such a plant would require about $1 million in state funds and federal assistance. In any case, MES hopes to implement the collection part of the plan as soon as possible.

The original grant proposal to EPA[28] lists the following objectives:

- Perform a state of the art review and analysis of existing technology for reclaiming, reprocessing, and re-refining waste oils.

- Provide a management program for collection and handling of waste oil. The program should specify the number of trucks, the collection network, pickup and delivery scheduling and storage points.

- Provide a preliminary financing plan with alternative methods of

financing and management.

- Perform preliminary engineering and prepare plans and specifications for the waste oil recovery system in the State of Maryland, such that detailed plans and specifications may be finalized and construction may proceed immediately.

By December 1972, EQSI had spent more than $40,000, completed the research for the first objective, and released a report, "Waste Oil Recovery Practices, State of the Art".

Although the Maryland system is to study production of both lube oils and heating fuel, MES has decided to emphasize fuel oil production from waste oil rather than lube oil re-refining. An earlier Maryland report, "Used Oils, A Waste or a Resource?"[29] favored the recycling approach but for several reasons MES, in 1972, decided against the approach. First, MES felt that it could not easily assure a demand for lube oil products for the state buys fuel oil for its buildings but has no motor pools to provide a market for automobile lube oils. Second, MES realized that the wider latitude in acceptability of fuel oil quality would reduce the need to control feedstocks and therefore would be likely to result in more oil being reprocessed and less being dumped in the environment. Third, the still unresolved technical problems involved in producing lube oil made it appear advisable to begin with the easier task of making fuel oil. Finally, MES hoped to avoid conflicts with lube oil producers by settling for a product that they felt would pose less competition as the fuel oil produced will be only a small percentage of total fuel oil presently purchased.

Dr. Peter Lederman, Director of NERC's Edison Water Quality Research Laboratory, is the Federal Project Officer for the Maryland Studies. Michael T. Long, Chief of Administrative Services, has monitored waste oil research for the MES but his responsibilities have recently been taken over by J. Carl Uhrmacher, MES Baltimore Regional Engineer. All system plans are expected by the end of September 1973, and the bottoms research is expected to be completed by the end of 1974.

(3) Blending Waste Oil for Fuel: GCA

In April 1972, the GCA Corporation, under a $29,500 contract with EPA, began an exploration of the economic and technical feasibility of using waste automobile oil for firing municipal incinerators[30]. Then in May 1973, EPA let a $50,000 contract to GCA for a study of the technical, economic, and environmental issues raised by using waste oil as a blended fuel oil, particularly in steam power plants[31].

GCA's report of its first contract study concluded that the physical and combustion properties of automotive waste oils make them quite suitable as an auxiliary fuel in municipal incinerators[32]. Using waste oil in this way was found to reduce combustible air pollutants and excessive residue

that result from wet or low heat-value refuse.

In reaching these conclusions, GCA reviewed the physical and chemical properties of waste oil to determine its suitability as a fuel oil. It used a combustion model of a refuse bed to estimate the quantities of waste oil needed, and evaluated alternative techniques for injecting the waste oil into the incinerator. It also assessed monitoring and control techniques, storage and fuel systems, capital and operating costs. Air pollution impacts were examined, but only lead concentrations around the incinerator were considered.

The second GCA contract -- on power plant fuel oil -- calls for a report on these issues:

- Collection and analysis of information on potential industrial demand, especially by steam power plants, for blended waste oil.

- Estimates of downtime and repair costs connected with use of different grades of pretreated waste oil in varying proportions with ordinary fuel oil of varying grades.

- Estimates of the profitability of pretreatment operations under varying assumptions as to input prices, output prices, and type of treatment.

- The effect of environmental restrictions on the economics and technology of pretreatment operations and power plants.

Richard Keppler was the EPA project officer for the first GCA contract and Dr. John A. Jaksch, an operations research analyst in the Office of Research and Development, is the project officer for the second GCA contract. The report from the first contract was released in February 1973 and the report from the second is due the end of January 1974.

(4) Systems for Collection and Reprocessing to Lube Oil: Teknekron

In March 1973, EPA let a $58,000 contract to Teknekron, Inc. of Berkeley, California for a project entitled, "A Technical and Economic Study of Waste Oil Recovery"[33]. Teknekron and its subcontractor, the Institute of Public Administration, will investigate the feasibility of setting up "closed loop" oil disposal and reprocurement systems, with special attention to opportunities at federal facilities.

According to the scope of work, Teknekron and IPA will:

- Report on current federal waste oil research programs and provide a waste oil disposal bibliography.

- Investigate dispersed generation of waste oil as a result of backyard, user-performed oil changes.

- Describe and evaluate the internal economics of the waste oil re-refining industry.

- Investigate the feasibility of establishing a "closed-loop" recycling system that could be demonstrated at a federal installation.

The Teknekron project is being supervised by Thomas D. Clark of EPA's Office of Solid Waste Management Programs. The study is to last six months, and the final report is scheduled to be completed by the end of December.

(5) Waste Oil Generation and the Technology, Economics, and Environmental Impacts of Re-Refining: Recon Systems

In June 1973, EPA let a $40,000 contract to Recon Systems, Inc. and Response Analysis Corporation for a joint effort to develop additional information on waste oil recycling[34]. The firms have two major objectives: 1) to describe and evaluate waste oil re-refining processes and their environmental impacts and 2) to measure the magnitude of the waste oil problem by developing a material balance survey program for selected major waste oil generation areas. Response Analysis Corporation will have a major role in developing the survey program.

According to the contract's statement of work, the study will include four primary tasks:

1. An assessment of current waste oil disposal techniques and all potential refining and re-refining processes for all types of waste oils. This is to include information on feedstocks, products, processes, environmental impacts, and economics.

2. A technical assessment of waste oil processes with recommendations for further work.

3. An environmental assessment of waste discharges from the waste oil processes examined, taking into account aesthetic damages and local, state, and federal regulations.

4. A preliminary material balance national survey program for major generation areas. The survey is to include the types, quantities, sources, and disposal practices for waste oil generated. Besides the survey plan, a "best" material balance is to be described.

The Recon study is being supervised by Leo McCarthy of EPA's Edison Water Quality Laboratory. The study is to be completed by mid-October and the final report released soon thereafter. It is anticipated that implemetation of the national survey developed and tested under this contract may require further expenditures for contract research.

(6) Federal Policy on Waste Oil: ELI

The Environmental Law Institute (ELI) of Washington, D.C., began a ten-month EPA research contract in July 1973 on the legal aspects of incentive approaches to pollution control[35]. Some part, possibly about half, of the $60,500 allotted to the entire effort will be focused on the specific problem of federal policies to control waste oil.

The scope of work requires:

- A comparative analysis of waste oil policies of industrial nations.

- A summary and evaluation of statutes, regulations, pending legislation, and proposals in subject areas related to waste oil.

- The identification and evaluation of broad alternative legal approaches to waste oil problems.

- A detailed description of the more feasible approaches, including the groundwork for statutory language.

Dr. Fred H. Able will be the EPA project officer. The Final Report is due in July 1974, but it is hoped that most of the findings will be available for inclusion in EPA's waste oil report to Congress in April 1974.

6.4 In-House Research and Past Studies

Part of the waste oil study mandated by Congress is to deal with the long-term, chronic biological effects of waste oil, and EPA has initiated in-house experimental research to provide the needed data. Testing of the effects of waste oil on aquatic life will be carried out at two locations. Research on freshwater life will take place at EPA's Natural Water Quality Laboratory in Duluth, Minnesota, and research on salt water life at EPA's National Marine Water Quality Laboratory in Narragansett, Rhode Island.

The research projects will measure the impacts of waste oil, crude oil, and refined oils. Although the entire project is to last one year, from July 1973 to June 1974, the first half of the study will be devoted entirely to waste oil. This is so that the results will be ready by January 1974 and available for inclusion in the EPA waste oil report to Congress.

Each of the National Water Quality Labs will devote about $40,000 to biological waste oil research in fiscal 1974.

Steven F. Hedtke, a research aquatic biologist at the Duluth Lab, will supervise freshwater tests, while Stanley Heggre at the Narragansett Lab will supervise marine tests. Both report to Dr. David Nyquist of EPA's Office of Environmental Sciences in Washington, D.C.

Several past EPA studies have dealt with ground disposal of waste oil. In October of 1972 the EPA's Edison Research Laboratory investigated the runoff from dirt roads treated with waste oil to suppress dust[36]. The study indicated that some 70 percent of the oil leaves the roadway on dust particles or in water runoff. Almost all the remaining 30 percent volatilizes and is biodegraded.

In addition, in December 1972 EPA completed a study of disposal of oily waste by soil cultivation[37]. The experiment in Deer Park, Texas, used soil microorganisms in an effort to determine how fast waste oil would decompose in landfill areas. At prevailing local soil and climate conditions, it was found that about one half pound of oil per cubic foot of soil would decompose each month without fertilizers.

In 1967, the Federal Water Pollution Control Administration funded a waste oil project, a demonstration of the caustic-base re-refining process[38]. The objective was to demonstrate a process for eliminating water pollution by waste oil re-refining plants. The project showed that the operating problems would not be much different than with the more typical acid-clay treatments and that sludge disposal would still be a major difficulty.

7.0 FEDERAL TRADE COMMISSION

The Federal Trade Commission (FTC) will soon consider softening the burdensome labeling requirements it has placed on waste oil products. FTC staff are preparing recommendations to be presented to the full Commission by December 1973 on the use of the word "recycled" in product labels.

7.1 Background

In 1958, the FTC ruled that the sale of reclaimed or re-refined lubricating oil without an indication of previous use was misleading and deceptive. It ordered that "any lubricating oil...composed in whole or in part of oil which has been reclaimed or in any manner processed from previously used oil be labeled with a clear and conspicuous statement to that effect on the container."[39]

In an attempt to comply with the FTC order, the Double Eagle Refining Co., one of the respondents[40], submitted label samples which included statements on the side of the container that the oil had been "scientifically RE-REFINED from previously used oil". The FTC approved this method of compliance in 1960, but in 1961 rescinded its approval because the statement of prior use was on the side rather than on the front of the container. The hearing examiner supported the re-refiner's position, but in 1964 the Commission overruled his decision and ordered that the statement be "on the front panels of the container".[41]

In addition to requiring front labeling, the FTC in the same year also promulgated a Trade Regulation Rule requiring a statement of "previous use" and also restricting the use of the word "re-refined". It prohibited the use of the term "re-refined" to describe "previously used lube oil unless the physical and chemical contaminants acquired through previous use had been removed by the refining process".[42]

Although there are no satisfactory estimates of the impact of the FTC orders, some observers feel that it has been a major cause of the progressive collapse of the re-refining industry and, in turn, of increasing environmental oil pollution.[43] Others have argued that the entire area of consumer response to terms like "recycled" is unknown.[44]

7.2 Interest

The FTC's interest in reconsidering its waste oil labeling rules

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stems largely from the impact of the National Environmental Policy Act of 1969 (NEPA). NEPA requires all federal agencies to report, and take into account, the environmental impacts of major actions. NEPA of course only applies to future major trade decisions with significant environmental consequences. In an effort to rationalize and systematize the FTC's new environmental responsibilities, the staff has initiated an effort to come up with general recommendations for changes in policy, particularly in the area of recycling of waste materials. The staff has decided, moreover, that the development of such policies calls for a reconsideration of past labeling rulings for previously used lube oil -- although not actually required by NEPA.

NEPA will expand the FTC's waste oil concerns in at least two directions: product quality and environmental impact. In its earlier labeling decisions, the FTC argued that product quality and performance was not the issue in its charges of deceptive trade.[45] The Commission felt that mandatory labeling could be completely justified on the basis that consumers are known to prefer new oil and tend to mistake reprocessed oil for new oil unless it is clearly labeled as reprocessed.[46] NEPA, however, requires the FTC to consider all alternatives including product quality. The Commission must consider whether the environmental damage from disposal alternatives to reuse, e.g. dumping, may be too high a price to pay for its labeling rules. Although the rule deals with traditional deception and takes cognizance of apparent consumer preferences, it may also lead misinformed consumers to reject high quality recycled oil. With potential markets constricted in this way, re-refining is likely to be replaced by other more damaging waste oil disposal practices. The actual quality of recycled oil, rather than its origin, this becomes a crucial factor in a NEPA-required balance of costs and benefits.

As for environmental impact, NEPA will require the FTC to predict both the abatement or creation of pollution and the consumption or conservation of resources resulting from rulings on recycled products. Both these tasks and the assessment of product quality require technical expertise that is in short supply at the FTC. The Commission staff will of necessity rely heavily on technical assistance from other federal agencies.

NEPA has affected the FTC's interest in waste oil in yet another way through its creation of the Council on Environmental Quality (CEQ). FTC participated during early 1970 in CEQ's task force on waste oil disposal.[47] Although the CEQ effort did not result in any major federal policy change, the FTC agreed at the time to reconsider its recycled oil labeling requirements should it appear that the oil could equal the quality of acceptable virgin oil.[48] However, a check by the FTC of several federal agencies, including the Bureau of Mines, reinforced its past finding that reprocessed oil was inferior.

7.3 Present Program

FTC staff members are now preparing recommendations for changes in labeling of products made from used materials, including reprocessed oil.[49]

In December 1972, the staff prepared a draft of a proposed guide for the use of the word "recycled" in product labels. The guide would attempt to restrict use of this designation to products which perform at least as well as comparable products made from virgin material. Issues still to be resolved include: the conditions under which labeling should be imposed, the location of labels showing past use, the information to be provided on the label, the percentage of used material needed to qualify a product as "recycled", and the use of similar words such as "recyclable", "reusable", and "refillable".

Since the FTC draft was prepared, the Commission has received comments from interested agencies, including EPA, Bureau of Mines, CEQ, and GSA, and also from consumer groups, Congressional committees, and marketing experts. FTC's staff plans to have a final draft and a report before the full Commission between September and December 1973. Nevertheless, even with immediate favorable action it is unlikely that the new labeling rule would be in effect before mid-1974.

Several problems threaten to slow action on the proposed changes. Considerable time and manpower will be required to conform with NFPA reporting requirements. Only one FTC employee has been assigned to the project and he has not been able to devote full time to this effort. Further, since the quality of recycled oil is still in dispute, the FTC may decide against permitting the use of the word "recycled" on the label. Finally, the release of EPA's definitive report to Congress on waste oil due in April 1974, may cause the FTC to delay the decision on labeling requirements.

7.4 Organization and Key Personnel

Recommendations for changes in FTC policy on recycled materials are being carried out in the Bureau of Consumer Protection under the direction of William Dixon, Assistant Director of Rules and Guides. Raymond Rhine is the attorney in charge of the project to consider "recycling" labels.

8.0 GENERAL SERVICES ADMINISTRATION

The General Services Administration (GSA) has recently taken a renewed interest in waste lube oil as a potentially saleable or recyclable commodity. It has completed a survey of waste oil generated by GSA vehicles and is expecting to eventually extend the survey to the entire Federal Government.

8.1 Background

GSA operates about 65,000 motor vehicles, the largest fleet after the Postal Service and the Defense Department. In contrast to these agencies, however, most of the servicing of GSA vehicles is done by service stations under government contract, and it is doubtful that the waste lube oils generated by them can be claimed by the U. S. Government. Of the 98 motor pools run by GSA, the great majority use such contracts. Moreover, many automobiles are leased by GSA and the drainings from such vehicles are even less likely to be legitimately claimed as Federal property.

Although GSA currently purchases no products made from used lube oil, the agency is active in a number of programs to procure supplies made from other used materials. The Federal Supply Service has set standards for the amount of post consumer paper waste included in 77 paper products it procures. Government toilet paper, for example, contains 50 percent recycled paper. GSA also reclaims platinum and silver from sparkplugs used in aircraft and heavy military vehicles. The silver and platinum is supplied back to sparkplug manufacturers as raw material.

8.2 Interest

Although GSA is the government's central purchaser for most goods, the agency has delegated the responsibility for procurement of lube oils to the Defense Supply Agency (DSA). Its interest in waste oil is therefore not in possible purchases of waste oil products such as re-refined lube oils. Rather, it would like to find ways to turn disposal of waste oil from a debit to a credit item. Recent fuel shortages have made GSA particularly interested in the possibility of using waste oil as a blended fuel oil.

GSA would be willing to subsidize improved waste oil reclamation through a special government purchase program for waste oil products but

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it is restricted by its legal mandate to purchase products of a given quality at least cost. The agency would need special Congressional authorization and funds to support such a subsidy. This approach has a precedent in the new federal statute on noise pollution.[50] This law allows GSA to pay 125% of normal retail price cost for products that have received a low noise certification from EPA.

8.3 Projects

In June 1973, GSA completed a small survey of the generation of waste oil from those of its vehicles serviced at the agency's own facilities. No special funds were committed to the project. Questionnaires were sent out to GSA motor pools by the Federal Supply Service's Office of Motor Equipment, Transportation, and Public Utilities. Data from the survey is still being interpreted and reviewed.

Information collected in the survey included:

- Number of vehicles in each fleet
- Number of vehicles serviced in-house
- Quantity of waste oil generated in-house over six months
- Method of waste oil storage
- Method of disposal
- Estimated cost of disposal
- Income from waste oil sales

8.4 Organization and Key Personnel

Andrew Kauders, Executive Director for Environmental Affairs, has the overall responsibility for GSA environmental programs. His office has agency-wide responsibility to monitor environmental programs, ensure compliance with environmental legislation, and initiate new environmental projects. William S. Eckert, Director of the Federal Supply Service's Property Rehabilitation Division, designed the waste oil survey and has overall responsibility for the rehabilitation, reclamation and recycling of Federally-owned property. Mr. Eckert is assisted in the waste oil survey by Mr. Michael Dee, Assistant Director.

9.0 DEPARTMENT OF THE INTERIOR

The Interior Department's Bureau of Mines is currently carrying out the first steps of a major technical study of processes to re-refine waste oil. It is hoping to get increased funding in the next several years so that it can proceed with full-scale engine testing. A report on progress to date is expected in the next few months.

9.1 Background and Interest

The Bureau of Mines' interest in the waste oil problem stems from its long experience with petroleum refining problems and from the opportunities offered by the Bureau's large testing laboratories.

Consistent with these interests, the Bureau believes that two major obstacles must be overcome before used oil can be successfully re-refined into lube oil. First, the technology of the re-refiner must be upgraded to produce a lube oil that meets requirements of modern automobile engines and military specifications. Second, the re-refiner must ge given a greater profit incentive to process the large amounts of used oil presently being dumped or disposed of in damaging ways. In this connection, the Bureau has come out in support of the legislation offered by Congressman Vanik to encourage oil recycling.[51]

Although some observers have questioned whether re-refining technology is at the heart of the waste oil problem, Bureau of Mines studies have shown that present re-refining processes produce oil that has lost much of its lubricity and oxidation stability. Therefore, there does appear to be room for improvement in this area.

9.2 Projects

The Bureau of Mines is proceeding with the initial laboratory work described in its April 1972 proposal, "An Issue Paper About...Waste Oil Recycling." The proposal calls for an extensive $1.5 million five-year research effort to develop and demonstrate methods of waste oil re-refining. The project is to use the technical facilities at the Bureau's Bartlesville Energy Research Center in Oklahoma. The Bureau received $125,000 in fiscal 1973 for laboratory work, but this was only a little more than half the amount requested in the Bureau's proposal for the first year of operations.[52] Large scale pilot testing of processes and engine testing of pro-

ducts were not granted funds. The Bureau has asked for $350,000 for fiscal 1974 but expects to receive about the same amount as in fiscal 1973.

Even before the Bureau of Mines began this specific project, it had looked into related issues. It had collected samples of waste oil and examined the contaminants, particularly wear metals. Some samples of recycled oils from existing re-refiners were also collected and analyzed using bench scale tests.

The Bureau's present program objective is the development of an efficient method for reclaiming waste lubricating oils. The objective is to be met through performance of the following tasks:

- Bench-Scale Quality Evaluation Tests. Improvements will be sought in some of the tests and in methods for categorizing the quality of lube oils.

- Bench-Scale Refining Operations. Three re-refining techniques are to be evaluated in the laboratory: acid extraction, caustic-based extraction, and solvent extraction.

- Pilot-Scale Operations. The most effective processing technique will be demonstrated in a pilot plant.

- Engine Testing. The re-refined lube oil products will be put through the full sequence of engine tests needed to demonstrate quality.

The Bureau has been able to proceed with the proposed evaluation of acid and caustic-based extraction, but has not been able to test the propane solvent method because information from industrial users has been inadequate.[53] The Bartlesville Center has evaluated commercially available processes and has used crankcase oil from its own automobile fleet as a feedstock.

The Bureau of Mines indicates that it has found a particular solvent extraction process that has good prospects of meeting the need for improved technology. It is presently engaged in testing the quality of products made with the process, and has been reluctant to divulge technical data before tests are completed.

9.3 Organization and Key Personnel

Mr. Richard M. Gooding, a petroleum chemist in the Bureau's Washington area office and C. C. Ward, Research Supervisor at the Bartlesville facility, are the Bureau's staff chiefly responsible for waste oil studies.

10.0 POSTAL SERVICE

The Postal Service is the Federal Government's greatest non-military generator of used automotive lube oils. It has long-standing general guidelines for non-pollution disposal of waste oil, but has no plans for further study or policy changes in this area.

10.1 Background

The Postal Service's 100,000 vehicles produce an estimated 650,000 gallons of used oil each year. Most of the oil is collected at the Service's 311 Vehicle Maintenance Facilities (VMF's). More than two-thirds of these facilities service between 300 and 1400 vehicles and store used oil in underground tanks until it can be sold or given away. Smaller VMF's store oil in 55 gallon drums until it is picked up, and very small facilities use commercial service stations.

Postal Service Methods Handbook M2, "Vehicle Maintenance Facilities", sets guidelines for the disposal of used oil. Although the guidelines were once mandatory, decentralization within the Service has given local managers the final decision.[54] The guidelines simply provide that VMF's enter into local annual contracts with companies who will pick up the waste oil. The Postal Service believes that since most of the scavengers appear not to be re-refiners, the oil collected is eventually used for fuel.[55]

10.2 Interests

The Postal Service would like to get rid of its waste oil at the least possible cost consistent with protection of the environment. Although most VMF's at one time were able to sell waste oil, almost all now must arrange to give it away and sometimes they must pay to have it collected. The Postal Service is certain that none of its facilities arbitrarily dump waste oil, but beyond this there appears to be little hard data on the generation, distribution, or ultimate disposition of used vehicle oils. In part, this is a reflection of thorough decentralization in the Postal Service.

10.3 Projects

Currently there are no Postal Service projects on waste oil and none are being planned. However, the Central Regional Office (Chicago) recently

considered the offer of a local re-refiner to reprocess vehicle oil for re-use by delivery vehicles. Although the price offered would be cheaper than virgin lube oils, the Postal Service is worried about the quality of the oil. It does not question the technical feasibility of re-refining but is doubtful that the Service could adequately police the integrity of the re-refiners. The stakes in terms of possible engine damage are high, and the Postal Service sees it as unlikely that it could collect damages if the re-refined oil should cause problems.

The Postal Service, like GSA, buys gasoline and oil through Defense Supply Agency (DSA) contracts. These invariably specify lube oil made only from virgin crude. However, the Postal Service is not prevented by these contracts from participation in "closed-loop" systems like the one offered by the Chicago re-refiner.

10.4 Organization and Key Personnel

Mr. Carl Myers, the Director of the Office of Fleet Maintenance, Bureau of Customer Services, is responsible for setting waste oil guidelines in the Postal Service. Merton Culver, Fleet Maintenance Management Officer, has major operational responsibility.

11.0 DEPARTMENT OF THE TREASURY

The Treasury Department interprets statutes that impose excise taxes on lube oil. Although Treasury has expressed disapproval of the tax loopholes for industrial lube oils which Congress enacted in 1965, it has no plans to request statutory changes. Nor does the department have any plans to reconsider its 1965 tax decisions that were unfavorable to the re-refining industry.

11.1 Background

Before 1965, the Treasury Department taxed lubricating oil made from crude petroleum at a rate of 6¢ per gallon. Re-refined or reclaimed oil was exempt on the grounds that this excise tax had already been paid when the oil was new. Typically, however, re-refiners would not market 100% recycled oil but would blend it in some ratio with virgin oil in order to meet certain viscosity requirements. Since the excise tax had to be paid on the new oil used for such blending, a gallon of the re-refiners' product was subject to taxation. The amount of the tax was proportional to the volume of virgin oil used in blending. Nevertheless, the blended oil itself was not subject to tax.[56] The 6¢ per gallon tax advantage (effectively less than 6¢ since most recycled oils were blended) frequently made re-refined lube oil an attractive substitute for virgin oil. Indeed, it was crucial to many re-refiners since their profit margins were generally smaller than the amount of the tax. The competitive edge was particularly important in sales to large users of cheap, low grade industrial lubricants. A few cents difference in unit price could make a big percentage difference in aggregate cost to such buyers. During the years just before 1965 a large proportion of the re-refining industry's lube oil output was for these off-highway uses.

The Federal Excise Tax Reduction Act of 1965, and subsequent Treasury Department rulings, destroyed most of the re-refiners' tax advantage on industrial oils.[57] The Act does not touch the re-refiners' tax exemption but creates a competitive tax exemption of sorts for virgin oil if bought by off-highway,that is chiefly industrial, users.[58] Specifically, it provides for Treasury payment of 6¢ per gallon to the ultimate purchaser of virgin lube oil carrying the 6¢ excise tax -- if the oil has not been used in highway motor vehicles. In effect the payment is a tax refund to off-highway users. In contrast, the Act maintains the tax on lube used for automotive purposes and dedicates its revenues to the highway trust fund. The highway lube oil excise tax was seen by Congress as an appropriate charge on highway users similar to the federal gasoline and tire taxes.

In sum, waste oil re-refiners kept their tax advantage on automobile lube oils but lost it on all other lube oils. Purchasers have to pay the excise tax initially if they buy virgin lube oil, but can get the tax refunded by the federal government at the end of the year by showing that the oil was not used in highway vehicles. This gives virgin lube oil used industrially the same tax exempt status previously enjoyed only by re-refined oil.[59]

Several questions about the tax liability of blended oils remained after the Excise Tax Reduction Act was passed. Since most of the re-refiners' lube products are blended, these questions were particularly important to the industry. Nevertheless, Treasury Department rulings have all been against the interests of the re-refiners or re-refining.

The issues were:

1) Are re-refiners exempt from paying the excise tax, i.e. do they deserve a refund as an off-highway user when they buy virgin oil to blend with their re-refined oil?

2) Are the off-highway purchasers of blended re-refined lube oil due a Treasury payment for that part of the oil bought which is virgin lube oil and carries the excise tax?

3) Is lube oil manufactured from a mixture of virgin crude oil and used oil subject to the 6¢ excise tax even though the law exempts previously used oil from the tax?

The Treasury Department decided that re-refiners do not qualify as an off-highway user and therefore are ineligible for a tax rebate on virgin oil they buy for blending.[60] Re-refiners who blend, for example, in a 50-50 ratio must pass on the 6¢ tax to their customers, i.e., at 3¢ a gallon. This would not be a serious problem if customers could in turn collect from Treasury either a 6¢ a gallon payment or at least a 3¢ a gallon payment to cover the excise tax carried by the new oil mixed in with the re-refined oil. Unfortunately for the re-refiners, Treasury also ruled that industrial buyers of blended recycled lube oil could not collect a refund since the product they purchased was not taxable.[61] The effect was that blended re-refined oil not only has lost its 3¢ a gallon tax advantage, it is now 3¢ more expensive relative to virgin oil because all opportunities to get a Treasury excise tax refund are lost in the blending operation. The non-highway user pays no excise tax for virgin oil, but continues to pay 3¢ a gallon tax on blended oil.

Finally, Treasury ruled that the introduction of used oil into the process of refining virgin crude oil did not thereby make the product "a mere blend or mixture" and exempt it from the excise tax as a blended oil using re-refined oils.[62]

11.2 Interest

The Treasury Department would be happy to repeal the cumbersome lube oil tax refund provision. However, this preference comes out of a desire for simplicity in the tax code rather than concern for the re-refining industry or the environment. Treasury feels that the re-refining industry is basically a dying industry and that special tax concessions will be ineffective.

The Treasury Department suggested to the Association of Petroleum Re-Refiners (APR) that their customers might be allowed a refund if the re-refiners would report the exact percentage of virgin oil in their blended lube oil. Treasury found APR industries unwilling to disclose the amount of virgin taxed oil used and nothing came of its suggestion.

11.3 Projects

No activity on lube oil taxation is planned or recommended by Treasury.

11.4 Key Personnel

John Copeland in Treasury's Tax Policy Division is responsible for overseeing excise taxes on lube oils.

12.0 DEPARTMENT OF TRANSPORTATION

The Department of Transportation (DOT) cooperated with the Department of Interior to publish in February 1968, "Oil Pollution", a special study requested by President Johnson. The report covered the general topic of water pollution by oil and other hazardous substances but emphasized major industrial sources and spills. It did, however, briefly mention the problem of waste oils from service stations, the first time auto lube wastes were recognized by the Federal Government as a significant source of pollution.

DOT currently has an active Coast Guard program to prevent and control oil spills on navigable waters. However, the agency is not doing anything in the area of waste oil from motor vehicles.

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13.0 DEPARTMENT OF AGRICULTURE

The U.S. Department of Agriculture (USDA) has no waste oil research projects at present, nor are any planned. However, the department operates and maintains the federal government's fourth largest vehicle fleet, 30,000 units, ranging from cars to large trucks.

The Forest Service manages USDA's largest fleet, some 13,600 vehicles, and operates 500 pieces of construction equipment. The Soil Conservation Service operates about 11,000 vehicles, the Animal/Plant Health Inspection Service, 2,400, and the Agriculture Research Service, 2,700. Pick-up trucks are the backbone of all USDA fleets. They account for almost 26,000 of the 30,000 total.

Nearly all the maintenance of USDA vehicles is carried out by commercial service facilities. Only the Forest Service services any of its own vehicles and even the Forest Service uses commercial servicing for three quarters of its vehicles. Fleet managers report that when the Forest Service changes oil in its own vehicles during repair or yearly preventative maintenance, it uses the same commercially available scavenger pick-up services used by service stations. Only when construction equipment is used in remote areas is it likely that waste oil will be dumped on the ground. Although the crankcases of such vehicles are relatively large, few vehicles are ever serviced at any one location at the same time, hence it is expected that the small volumes of waste oil dumped on the ground can be naturally degraded without environmental damage.

There are currently no department-wide guidelines on waste oil disposal procedures except a general requirement that vehicles be serviced safely in accordance with manufacturers' specifications.

K.H. Boyer, Assistant Director for Telecommunication, Transportation, and Physical Security (Office of Plant and Operations), has responsibility for department policy on maintenance and management of USDA vehicles. Oliver Broadway has chief responsibility for vehicle maintenance within the Forest Service.

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14.0 NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) has no current research in waste lube oil disposal and has no plans to allocate funds to such research. However, NSF is carrying on studies in related areas and has interests and an organizational framework which could easily encompass waste oil research.

NSF is funding studies in the field of waste management strategies, an activity carried on in NSF's Division of Environmental Systems and Resources. This is one of the operating divisions of the Applied Research Directorate. The Applied Research Directorate in turn is the unit set up to administer the RANN program (Research Applied to National Needs), a major NSF effort to support practical research with a significant rear-term benefit to the nation.

Edward H. Bryan is a program manager for Regional Environmental Systems within the Division of Environmental Systems and Resources. Waste management strategies are his particular concern.

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ACKNOWLEDGMENT

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CITATIONS

1. Under the National Environmental Policy Act of 1969, signed January 1, 1970.
2. See p. 14.
3. For tax laws on waste oil re-refining, see Section 2.10, "Treasury Department".
4. "Federal Water Pollution Control Act Amendments of 1972", PL 92-500,33 USC 1151, 86 Stat. 816, October 18, 1972. See Appendix A for full language.
5. "Waste Oil Study, Preliminary Report to Congress", April, 1973.
6. Sen. Boggs chaired an entire day of waste oil hearings on June 9, 1967, before the Subcommittee on Air and Water Pollution of the Senate Public Works Committee (p.261 of Water Pollution - 1967, Part I)
7. HR 5902, introduced March 20, 1973; referred to Ways and Means Committee. Remarks, March 14, 1973 (Congressional Record E1543). This is an identical bill to the one Vanik introduced June 14, 1972; remarks, June 14, 1972 (Congressional Record E6208). Vanik had introduced earlier, less sophisticated legislation to reform lube oil excise taxes on December 2, 1971, (HR 12015) and on January 18, 1972 (HR 12433).
8. See Appendix B for full language.
9. S 409, introduced Jan. 16, 1973, identical to a bill Thurmond introduced March 21, 1972. Remarks, March 21, 1972 (Congressional Record S4314).
10. HR 4421, introduced Feb. 20, 1973. This bill and the Thurmond bill are identical to the bill Vanik first introduced in January 1972.
11. The current Vanik bill, in contrast, would abolish the excise tax exemption on off-highway virgin lube oil, rather than extend it to purchases by re-refiners.
12. S 3890, introduced July 26, 1968 by Sen. Boggs, co-sponsored by Sens. Muskie and Randolf, referred to the Commerce Committee.
13. LC-990, superseding LC-360.
14. See footnote #4.

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15. See FTC, p. 33.

16. About 2 percent of all lube and industrial oils and greases sold annually in the U.S. are procured by the federal government. Most of these products are centrally purchased for all federal agencies by the Defense Supply Agency through its Defense Fuel Supply Center (DFSC). During fiscal 1971, DFSC procured 23,900,000 gallons of motor oils.

17, "Waste Oil Recycling Study", DSA, September 1972, p. 1. MIL-L-46152 (engine oil) requires virgin oil regardless of the performance of competing re-refined oil.

18. DSA, Cameron Station, Alexandria, VA. 22314, contact: Jan Reitman, Field Support Division.

19. San Diego, Norfolk, Pearl Harbor, Puget Sound, Oakland, Long Beach, Guam, Jacksonville and Charleston. Facilities in these areas account for about 90% of the Navy fuel handled.

20. The Navy originally intended to look for "new products" to use oily wastes as raw material. After contacting major oil companies and universities with strong petroleum interests, the idea was dismissed as a waste of time.

21, "POL Disposal Techniques" , U.S. Air Force Contract No. F29601-73-C-0047, with Esso Research and Engineering, Linden, New Jersey, January 23, 1973.

22. "Reuse of Waste POL's", U.S. Air Force Contract No. F29601-73-C-0101, with Esso Research and Engineering Company, Linden, New Jersey, May 1, 1973.

23. For explanation of EPA's NORCO project, see Section 6.0, p. 23.

24. See note #4, p. 53 and Appendix A.

25. National Oil Recovery Corporation, March 1971, Project #15080 DBO, EPA Water Quality Office.

26. "Recycling Waste Oils into Direct Fuels and Other Petroleum Products", EPA Contract No. 68-01-0177, March 7, 1972.

27. American Petroleum Institute, "Waste Oil Roundup....No. 1", p.5.

28. "Oil Recovery Program", December 7, 1971.

29. Wilfred H. Shield, Jr., Chief, Solid Waste Services, Maryland Environmental Service, and Walter A. Miles, Head, Monitoring and Surveillance Section, Division of Solid Waste Management, Maryland Department of Mental Hygiene. April 1971.

30. "Study of Waste Auto Lubricants as Incinerator Fuel", EPA Contract No. 68-01-0186, with GCA Corporation, Bedford, Massachusetts, April 19, 1972.

31. "A Study of the Economic, Technical, and Environmental Factors Affecting Reuse of Waste Oil as a Blended Fuel Oil", EPA Contract No. 68-01-1859, May 17, 1973.

32. "Study of Waste Automotive Lubricating Oil as an Auxiliary Fuel to Improve the Municipal Incinerator Combustion Process", by GCA Corporation, Bedford, Massachusetts, February 1973.

33. "Technical and Economic Study of Waste Oil Recovery", EPA contract No. 68-01-1806, with Teknekron, Inc., Berkeley, California, March 26, 1973.

34. "Develop Information on Waste Oil Recycling", EPA Contract No. 68-01-1870, with Recon Systems, Inc., Princeton, New Jersey, June 18, 1973.

35. "The Legal Aspects of Incentive Approaches to Pollution Control", EPA Contract No. 68-01-2203, Washington, D.C., June 28, 1973.

36. Freestone, F.J., "Runoff of Oils from Rural Roads Treated to Suppress Dust", EPA Report #EPA-R2-72-054, October 1972.

37. "Oily Waste Disposal by Soil Cultivation Process", EPA-R2-72-110, December 1972.

38. "Final Progress Report on Water Pollution Control Demonstration Grant No. WPD-174-01-67" by Villanova University.

39. 54 FTC 1026-1034, Sayler Refining Co., Inc. et al., and 54 FTC 1035-1042, Frank A. Kerran et al., doing business as Double Eagle Refining Co., February 14, 1958.

40. The FTC has ruled on 16 lube oil labeling cases, of which 6 have ended in appelate court decisions, including 54 FTC 1035-1042.

41. 66 FTC 1039-1068, Double Eagle Lubricants, Inc., et al., October 22, 1964. The opinion does not require a statement of "previous use" rather than "re-refined" as some reports of FTC lube oil actions have asserted. (See "Waste Oil Practice, State of the Art", EQSI.) The ruling does, however, expand on the 1958 order by prohibiting re-refiners from representing that their lube oil "composed in whole or in part of oil that has been manufactured, reprocessed, or re-refined from oil that has been previously used for lubricating purposes, has been manufactured from oil that has not been previously used". Since, if the lube oil were composed only in part of used oil, it would be manufactured from oil that had not been previously used, the ruling appears to prevent re-refineries from making truthful statements about virgin stock used in these products, e.g. in blending. Although this issue has never been brought before the Commission, FTC staff have told industry representatives that they would

support requests to indicate blending on product labels.

42. Deceptive Advertising and Labeling of Previously Used Lubricating Oil, 16 CFR 406.5, 29 F.R. 11650. August 14, 1964. The term "re-refined" is not entirely prohibited under this regulation. However, the Commission restricted its use because it found that the term could be misleading. To some consumers it might imply a virgin oil which had been refined more than once. Even when put on notice that the oil had been previously used, many consumers would be led to believe that the oil had been restored to its original condition by a complete refining process.

43. "The labeling requirement knocked the bottom out of the re-refined oil market...because the label suggested low quality, consumers assumed it to be an inferior product, the demand for used oil consequently dropped sharply; the re-refiners and reprocessors had to lower their manufacturing costs so they could still make a profit." Wilfred H. Shields, Walter A. Miles, "Used Oils: A Waste or a Resource", April 1971, p. 9.

44. Edward F. Morrison, Staff Assistant to Congressman Charles A. Vanik (D-Ohio).

45. "The complaint does not question the quality of respondent's oil", 66 FTC 1039.

46. 16 CFR 406.2(a). This view was upheld by the U.S. Court of Appeals, 10th Circuit, in approving the FTC's cease and desist order, Frank A. Kerran v. Federal Trade Commission, 265 F2d 246 (1959).

47. See p. 32.

48. Although the FTC argued that quality was not an issue in its original used oil labeling orders, during its considerations it was persuaded by technical evidence that much of the lube oil made from used oil was indeed inferior.

49. Under Section 7 of the Vanik oil recycling bill, HR 5902, all recycled oils, defined as oils identical or superior to new oil intended for the same purpose, would carry the label "Recycled Oil", and EPA would set regulations requiring container labels that advise the purchaser to recycle the oil or dispose of it in an otherwise proper manner. See Appendix B.

50. Noise Control Act of 1972, enacted October 27, 1972.

51. See p. 37.

52. $228,000 was requested for the first fiscal year.

53. Specifically, information from the Institute Francais du Petrole (IFP).

54. The guidelines will soon be republished to reflect their non-mandatory nature. The title and number are not yet determined.

55. A preliminary investigation of this supposition indicates that waste oil may frequently be used for space heating fuel in small industries, or, in the warmer climates of the nation, may be sold for re-refining feedstocks.

56. 26 CFR 48.4091-2 (b)(ii-iii), "Manufacturers on whom taxes are imposed do not include "any person who merely cleans, renovates, or refines used or waste lubricating oil, or any person who merely blends or mixes one or more taxable oils with used or waste lubricating oil that has been cleaned, renovated, or refined." Section 314.40(d)(3) of Treasury Regulation 44.

57. Amendments to the Internal Revenue Code, 1954, PL 89-44, June 21, 1965.

58. By adding a new Section 6424 to the Internal Revenue Code of 1954.

59. Although the tax changes were damaging to re-refiners, it appears that Congress did not intentionally set out to burden the industry. Instead, the Administration and Congress were in a mood to cut taxes in 1965. President Johnson's bill would have repealed all excise taxes on lube oils. The House agreed to drop the tax on off-highway use on the grounds that 1) the Highway Trust Fund was in special need of more revenue and 2) that some tax advantage was needed to keep the re-refining industry alive. The Senate disagreed with both the President and House and kept the full lube tax, arguing that it was needed by the re-refiners. The House views prevailed in conference committee with, it is reported, very little or no pressure from competing virgin oil producers or industrial users. Senate Report No. 324, p. 26, June 14, 1965 and House Report No. 433, p. 21, May 28, 1965.

60. Rev. Rul. 68-108.

61. Rev. Rul. 68-108. It is customary tax code theory that if a taxable good is used in making another taxable good, the initial tax is forgiven. In this case, however, no tax is paid on the second good, i.e. blended re-refined lube oil, and so the first tax, i.e. on virgin lube oil for blending, was not forgiven.

62. Rev. Rul. 57-204. This decision is not strictly an anti-re-refiners decision although it may be an anti-re-refining decision. It is anticipated that a decision that allowed an exemption would have spurred the major oil refiners to include <u>some</u> used oil in their crude oil processing in order to escape the excise tax on lube oil products. This might have resulted in greater recycling of waste oil - though how much is uncertain since the volume percentage in the final product from waste oil would have been minute. It is more certain that such an exemption would thereby lose their tax edge in the highway market in addition to losing it in the off-highway industrial market.

63. Stat. 823, PL 92-500, October 18, 1972.

APPENDIX A

SECTION 104(m) OF THE FEDERAL WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972[63]

"(m) (1) The Administrator shall, in an effort to prevent degradation of the environment from the disposal of waste oil, conduct a study of (A) the generation of used engine, machine, cooling, and similar waste oil, including quantities generated, the nature and quality of such oil, present collecting methods and disposal practices, and alternate uses of such oil; (B) the long-term, chronic biological effects of the disposal of such waste oil; and (C) the potential market for such oils, including the economic and legal factors relating to the sale of products made from such oils, the level of subsidy, if any, needed to encourage the purchase by public and private nonprofit agencies of products from such oil, and the practicability of Federal procurement, on a priority basis, of products made from such oil. In conducting such study, the Administrator shall consult with affected industries and other persons.

"(2) The Administrator shall report the preliminary results of such study to Congress within six months after the date of enactment of the Federal Water Pollution Control Act Amendments of 1972, and shall submit a final report to Congress within 18 months after such date of enactment."

APPENDIX B

NATIONAL OIL RECYCLING ACT

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93D CONGRESS
1ST SESSION

H. R. 5902

IN THE HOUSE OF REPRESENTATIVES

MARCH 20, 1973

Mr. VANIK introduced the following bill; which was referred to the Committee on Ways and Means

A BILL

To provide for the recycling of used oil and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "National Oil Recycling Act".

PURPOSES

SEC. 2. Congress finds that hundreds of millions of gallons of used oil are being wasted each year, and are being disposed of in ways which pollute the waters, air, and land of the United States. For the purposes of—

(1) protecting the health and welfare of the people of the United States;

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(2) restoring, preserving, and enhancing the Nation's environment; and

(3) conserving oil for the national defense; Congress declares that to the greatest extent possible consistent with this Act and other Federal law, used oil shall be recycled.

DEFINITIONS

SEC. 3. For the purposes of this Act—

(1) the term "used oil" means all oil which has through use been contaminated by physical or chemical impurities which have not been removed by subsequent re-refining or other processing;

(2) the term "recycled oil" means used oil which has been re-refined or otherwise processed to remove the physical and chemical contaminants acquired through use, which by itself or when blended with new oil or additives is substantially identical or superior to new oil intended for the same purposes;

(3) the term "new oil" means all oil which has been refined from virgin oil and may or may not contain additives, but has never been used. The term "new oil" does not include "used oil" and "recycled oil" defined in subsections 3 (1) and 3 (2);

(4) the term "lubricating oil" means all oil regardless of origin, which-

(A) is suitable for use as a lubricant, or

(B) is sold for use as a lubricant;

(5) the term "hydraulic oil" means all oil which is used primarily to transmit power or pressure, but which may also serve lubricating and other functions;

(6) the term "cutting oil" means all oil which is used primarily in cutting, milling, and machining operations (including forging, drawing, rolling, shearing, punching, and stamping), but which may also serve lubricating and other functions;

(7) the term "fuel oil" means all oil which has been refined, re-refined, or otherwise processed for the purpose of being burned to produce heat;

(8) the term "automotive oil" means all oil, including lubricating oil and hydraulic oil, which is used in automobiles, trucks, buses, motorcycles, and all other motor vehicles which travel on roads and highways;

(9) the term "industrial oil" means all oil exclusive of virgin oil, fuel oil, oils used for cooking and medicinal purposes, and automobile oil. Industrial oil includes, but is not limited to, lubricating oil, hydraulic oil, and cutting oil when such oils are not automotive oils;

(10) the term "used oil collector" means any person who controls a system which functions to retrieve

or collect used oil for sale or transfer to oil recycling facilities, or for other methods of disposal;

(11) the term "used oil recycler" means any person who re-refines or otherwise processes used oil to remove its physical and chemical contaminants.

TAX PROVISIONS

SEC. 4. (a) The Internal Revenue Code of 1954, Subpart B—Lubricating Oil, is amended to read as follows:

"SEC. 4091. IMPOSITION OF TAX.

"There is hereby imposed on lubricating, hydraulic, and cutting oils (other than recycled oils) which are sold in the United States by the manufacturer or producer a tax of 6 cents per gallon, to be paid by the manufacturer or producer.

"SEC. 4092. DEFINITIONS.

"(a) CERTAIN VENDEES CONSIDERED AS MANUFACTURERS.—For the purposes of this subpart, a vendee who has purchased lubricating, hydraulic, or cutting oils free of tax under section 4093 shall be considered the manufacturer or producer of such oils.

"(b) LUBRICATING OIL.—The term 'lubricating oil' means all oil regardless of origin, which—

"(1) is suitable for use as a lubricant, or

"(2) is sold for use as a lubricant.

"(c) HYDRAULIC OIL.—The term 'hydraulic oil' means

all oil which is used primarily to transmit power or pressure, but which may also serve lubricating and other functions.

"(d) CUTTING OIL.—The term 'cutting oil' means all oil which is used primarily in cutting, milling, and machining operations (including forging, drawing, rolling, shearing, punching, and stamping), but which may also serve lubricating and other functions.

"(e) RECYCLED OIL.—The term 'recycled oil' means used oil which has been re-refined or otherwise processed to remove the physical and chemical contaminants acquired through use, which by itself or when blended with new oil or additives is substantially identical or superior to new oil intended for the same purposes.

"SEC. 4093. EXEMPTION OF SALES TO PRODUCERS.

"Under regulations prescribed by the Secretary or his delegate, no tax shall be imposed under this subpart upon lubricating, hydraulic, or cutting oils sold to a manufacturer or producer of such oils for resale by him."

(b) Section 4094 of the Internal Revenue Code of 1954 (Subpart B—Lubricating Oil, cross reference) is hereby repealed.

(c) Section 6424 of the Internal Revenue Code of 1954 (providing off-highway users of lubricating oils with a tax refund of 6 cents per gallon) is hereby repealed.

FEDERAL ENCOURAGEMENT OF THE USE OF RECYCLED OIL

SEC. 5. All Federal officials shall act within their authority to encourage the use of recycled oil. Such action includes, but is not limited to—

(1) procuring recycled automotive and industrial oils for all military and nonmilitary Federal uses, whenever such recycled oils are available at prices competitive with those of new oil produced for the same purposes;

(2) requiring all persons contracting with the Federal Government to use recycled oil in performing such contracts, whenever recycled oils are available at prices competitive with those of new oil produced for the same purposes;

(3) educating the Government and private sectors of the economy as to the merits of recycled oil, and the need for its use in order to reduce the drain on the Nation's oil reserves and minimize the disposal of used oil in ways harmful to the environment;

(4) where necessary, assisting and encouraging the development of performance standards and specifications, and systematic and economical testing procedures to facilitate the comparison of recycled oil with new oil.

STATE REGULATION AND ENCOURAGEMENT

SEC. 6. (a) This Act shall in no way preempt State regulation of recycled oil or used oil disposal whenever

such regulation provides for stricter control of recycled oil or used oil than provided for by Federal law.

(b) The States should encourage the use of recycled oil in order to accomplish the purposes of this Act. In order to qualify for Federal grants under section 12 of this Act, States shall adopt laws, regulations, and administrative machinery which shall provide for, but not be limited to—

(1) requiring that used oil collectors obtain State permits prior to engaging in used oil collecting activities. Such permits shall require as a minimum information pertaining to methods for collecting, storing, transferring, and disposing of used oil, as well as the identity of used oil sources, purchasers, transferees, and disposal sites;

(2) requiring that used oil recyclers obtain State permits prior to engaging in recycling operations. Such operating permits shall require as a minimum information identifying—

(A) the sources and quantities of used oil to be acquired for recycling;

(B) the recycling facility's plant size and operating capacity;

(C) the specific recycling technologies to be utilized;

(D) the quantities and grades of recycled oil to be produced; and

(E) the methods of disposing of the waste byproducts;

(3) when recycled oil is available at prices competitive with new oil, using recycled oil for all automotive and industrial uses of the State government, and requiring all parties contracting with the State to use recycled oil in the performance of such contracts;

(4) regulating the retail sales of automobile oil not covered by section 8 of this Act so as to encourage the recycling of used oil;

(5) prohibiting the use of used oil as fuel oil or for the oiling of State roads, unless such oil has been processed to meet the minimum standards for such uses established by Federal and State pollution control laws;

(6) educating the public and private sectors of the State as to the merits of recycled oil, and the need for its use in order to reduce the drain on the nation's oil reserves and minimize the disposal of used oil in ways harmful to the environment.

LABELING OF OIL

SEC. 7. (a) All recycled oil shall bear on the front panel of the container in which such oil is packaged for sale the inscription "RECYCLED OIL" clearly and prominently placed. All automotive and industrial oil, both new and re-

cycled, shall bear on the container in which such oil is sold the inscription "It is in the national interest to recycle this product after use."

(b) The Administrator of the Environmental Protection Agency shall promulgate regulations requiring all containers of automotive and industrial oil, both new and recycled, to bear labels relating to the proper disposal of such oils after use.

RETAIL SALES OF AUTOMOTIVE OIL

SEC. 8. (a) Automotive oil packaged for sale for self-service or carry away by the consumer shall be sold in resealable containers capable of holding used oil without spillage.

(b) All persons making resealable container sales shall collect a customer deposit of $0.10 per resealable container regardless of size. This deposit shall be refunded upon return of the container, either containing used oil or empty.

(c) All persons who sell automotive oils shall maintain used oil collection facilities on their premises. Such facilities shall—

(1) be of sufficient size and capacity to handle all customer returns of used oil and used oil containers; and

(2) be serviced on a regular basis by used oil collectors who dispose of such used oil in a manner not in contravention to this Act.

RESTRICTIVE CONTRACTS PROHIBITED

SEC. 9. (a) It shall be unlawful for any person to enter into any contract or agreement where the intent of such contract or agreement is to discourage the recycling of used oil.

(b) Violations of subsection (a) are subject to a fine of $50,000 for each violation thereof, or imprisonment for a term not to exceed one year, or both.

RECORDS

SEC. 10. (a) Users of more than 100 gallons of industrial oil per year shall maintain complete records of—

(1) the quantities and types of all oils purchased for industrial use;

(2) the quantities and types of all industrial oils consumed during use; and

(3) the quantities and types of all industrial oils disposed of after use—

(A) by in-house recycling;

(B) by delivery to or pickup by used oil collectors or used oil recyclers; or

(C) by any other method of disposal.

(b) Used oil recyclers shall maintain complete records of—

(1) the quantities and types of all used oil acquired;

(2) the quantities and types of all new oil acquired for use in blending recycled oil;

(3) the quantities, types, and sources of sale or other disposal of all recycled oil produced; and

(4) the quantities, types, and places of disposal of all waste byproduct generated in the recycling process.

(c) Used oil collectors shall maintain complete records of—

(1) the quantities and types of used oil collected; and

(2) the quantities and types of used oil—

(A) delivered to recyclers; and

(B) otherwise disposed (including the place of disposal).

(d) Records required to be kept by this section or any other provision of this Act shall be kept in accordance with regulations promulgated by the Secretary of the Treasury, the Secretary of Commerce, and the Administrator of the Environmental Protection Agency.

REPORTS

SEC. 11. The Administrator of the Environmental Protection Agency shall make reports to Congress no later than March 31 of each year, such reports containing, but not limited to, the following information—

(1) the amount of automotive and industrial oil sold throughout the United States each year;

(2) the amount of used oil recycled each year;

(3) the significance of used oil as a contributor to water pollution and other environmental problems; and

(4) the problems of the oil recycling industry (including new technological requirements and necessity for tax incentives).

MANDATORY LICENSING

SEC. 12. Whenever the Administrator of the Environmental Protection Agency determines—

(1) that—

(A) in implementing the provisions of this Act, a United States patent right not otherwise available is necessary to enable any person to comply with this Act; and

(B) there are no reasonable alternative methods to accomplish this Act's purposes; and

(2) that the inavailability of such patent right may result in a substantial lessening of competition or a tendency to create a monopoly in any line of the Nation's commerce, the Administrator, through the Attorney General, may so certify to a district court of the United States, which may order the person owning the patent to license it on such reasonable terms as the court, after hearing, may determine.

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PENALTIES AND ENFORCEMENT

SEC. 13. (a) Violations of section 4 shall be punished as provided for by the Internal Revenue Code of 1954 (as amended). Violations of section 9 (Restrictive Contracts Prohibited) shall be punished as provided for in section 9. Any person violating any provision of this Act which does not provide for specific penalties or punishment thereunder shall be subject to a civil fine not to exceed $25,000 for each violation, or be guilty of a misdemeanor punishable by six months in a Federal penitentiary for each violation, or both.

(b) It shall be the duty of the United States Attorney General and his representatives, United States attorneys, to prosecute violations of this Act. In the event that the Federal Government fails to fulfill its duty of enforcement under this Act, any citizen may bring an action in his or her name to enforce this Act without regard to any amount of alleged damages.

GRANTS AND APPROPRIATIONS

SEC. 14. (a) There is hereby authorized to be appropriated for the fiscal year ending June 30, 1974, and for each succeeding fiscal year, $25,000,000 for grants to the States to assist them in fulfilling the purposes and provisions of this Act. The Administrator of the Environmental Protection Agency shall make allotments to the States, not to exceed 10 cents per capita for any State based on the

latest national census, when he has determined that they are in compliance with this Act. The Administrator may prescribe regulations, pursuant to this Act, governing the expenditure of the allotments.

(b) There is hereby authorized to be appropriated for the fiscal year ending June 30, 1974, and for each succeeding fiscal year through the fiscal year ending June 30, 1977, $10,000,000 for the development of new processes and technology to be used in the economical and ecological recycling of used oil. The Administrator of the Environmental Protection Agency may make grants of this money, pursuant to regulations and requirements he shall adopt, to private parties, or use this money within the Environmental Protection Agency for the above purposes.

(c) There is hereby authorized to be appropriated for the fiscal year ending June 30, 1974, and for each succeeding fiscal year, through the fiscal year ending June 30, 1977, $5,000,000 for the development of standards and testing methods to facilitate the comparison of recycled oil with new oil. The Secretary of Commerce may make grants of this money, pursuant to regulations and requirements he shall adopt, to private parties, or use this money within the Department of Commerce for the above purposes.

EFFECTIVE DATE

SEC. 15. Section 9 (Restrictive Contracts Prohibited) of this Act is effective immediately upon this Act becoming law.

Section 4 (Tax Provisions) of this Act becomes effective on the first day of the calendar quarter following the day this Act becomes law. All other provisions of this Act become effective ninety days after this Act becomes law.

APPENDIX C

ANNOTATED BIBLIOGRAPHY OF PUBLICATIONS CONCERNING WASTE OIL DISPOSAL

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American Petroleum Institute, Engine Service Classifications and Guide to Crankcase Oil Selection, API Publication #1509, Washington, D.C., January 1971.

This pamphlet discusses why the engine service classification was developed and the basis of the classification system. API gives a definition for each classification catagory.

American Petroleum Institute, Farm Equipment Lubrication-Questions/Answers, API Publication #1507, Washington, D.C.

American Petroleum Institute, Final Report of the Task Force On Used Oil Disposal, API Publication No. 4036, Washington, D.C., May 1970.

The Task Force recommended that the burning of used auto lubricating oils, blended with residual fuel oil, be encouraged as an effective way to deal with disposal problems. It also recommended 1) that service stations continue to contract with scavengers for waste oil pick-up (or that major suppliers attempt to enter annual contracts for regional pick-up), 2) that contracts between oil companies and service stations require non-polluting disposal, and 3) that the API should provide information and support for state legislation which assumes safe, cheap, non-polluting, and non-disruptive disposal. API's Task Force conducted a survey of service stations and examined five burning tests by major oil producers. Although burner fouling occurred in the burning tests, API recommended that waste oil be burned in a 25% blend.

American Petroleum Institute, How to Sell Motor Oil, API Publication #1508, 1972.

Marketing and salesmanship techniques for the service station attendant are described.

American Petroleum Institute, Know Your Motor Oil, API Publication #1507, April 1971.

Engine demands and motor oil characteristics are simply discussed. Criteria for choosing oil and determing oil change frequency are given.

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American Petroleum Institute, Lubricant Service Designations for Automotive Manual Transmissions, API Publication No. 1560, 1972.

The API-GL series is described for different engine designs and operating conditions.

American Petroleum Institute, Lubrication of Earth Moving and Other Heavy Duty Equipment, API Publication #1578, Washington, D. C.

American Petroleum Institute, Manual on Disposal of Refinery Wastes, First Edition, Washington, D.C., 1969.

A loose-leaf binder contains technical alternatives for disposing of liquid wastes from references.

American Petroleum Institute, The Migration of Petroleum Products in Soil and Groundwater, Principles and Countermeasures, Publication No. 4149, Washington, D.C., January 1973.

The booklet describes fire hazards and safety procedures; water contamination hazards; spill control and recovery; detection and analysis techniques; biological degradations of petroleum; and actual incidents of oil migration.

American Petroleum Institute, Motor Oil Guide, API Publication #1551, 1972.

The guide discusses the same issues covered by Know Your Motor Oil but in a more thorough, less popularized way. It discusses engine lubricating functions of motor oil, engine design, the lubrication system, contamination, driving habits, additives, and oil classification systems.

American Petroleum Institute, Petroleum Facts & Figures 1971, and 1972 Annual Statistical Review, Washington, D.C.

Statistics are reported for crude production, refining, transportation, marketing, use, prices, and taxes.

American Petroleum Institute, Committee on Disposal of Waste Products, Division of Marketing, Waste Oil Roundup... No. 1 and Waste Oil Roundup... No. 2, API Publication No. 1582, Washington, D.C., September 1972 and April 1973.

These reports are an attempt by the API to provide a clearinghouse for new developments and findings on waste oil collection and disposal. The first Roundup reports data on the magnitude of the waste oil problem, disposal methods, collection, research on technical solutions, and legislation. The second issue reports comments made on the first issue, repeats much of its data, and adds new information on waste oil research. The Roundups announce that the API's Committee on Disposal of Waste Products has a program to develop non-polluting disposal techniques for using waste oil in refinery feedstocks or for blending with heavy heating oil.

American Petroleum Institute, Why Change Motor Oil and When, API Publication No. 1576, 1972.

This is a slide show and accompanying script which describe what happens when motor oil is not changed periodically.

American Society for Testing and Materials, ASTM Research Report D2:1002, Revised January 1971.

The ASTM here establishes the test methods and performance characteristics for various grades of lube oil, and also technically describes each of the grades.

Armour Research Foundation, Separation and Characterization of Acid Sludge, Report No. ARF-3859-3, April 19, 1962.

The report done for the Association of Petroleum Re-Refiners concludes that one half the acid sludge from re-refining operations is organic, including equal parts of lube oil, polymers, and asphalt. Solids are largely lead, barium sulfates, and carbon. A boiling paraffin solvent was found best for extracting the oil and polymers. The report represents the third phase of a three-phase project for APR.

Armour Research Foundation, Study of Re-Refining Waste Disposal, Report No. ARF-3829-7, May 19, 1961.

The report done for the Association of Petroleum Re-Refiners examines solvent extraction processes in an effort to avoid the acid sludge residue resulting from re-refining techniques. Phenol was the most effective sludge extraction solvent found, but it did not extract all ash components. Some work on acid sludge disposal and separation was also reported.

Armour Research Foundation, Study of Re-Refining Waste Disposal Problem, Report No. ARF-3829-6, April 5, 1961.

This report presents a bibliography of material relevant to Armour's study of non-acid re-refining methods for the Association of Petroleum Re-Refiners.

Armour Research Foundation, Study of Re-Refining Waste Disposal, by R. E. Putscher, Report No. ARF-3808-5, January 29, 1960.

The study for the Petroleum Re-Refiners Association examined ways of eliminating or minimizing the acid sludge disposal problems by non-acid methods of treatment. Crankcase drainings from different parts of the country were found to be uniform in composition. Evaluation of several chemical flocculents and solvent precipitants showed no obvious preferred choice.

Arthur D. Little, Study of Waste Oil Disposal Practices in Massachusetts, Report to the Commonwealth of Massachusetts, Division of Water Pollution Control, Report No. C-70698, Cambridge, Mass., January 1969.

The study was commissioned to provide a basis for future waste oil program planning in the state. The scope included: annual quantities generated, geographic distribution, types of sources, amounts disposed of by various methods, disposal practices of collectors and reprocessors, cost of reprocessing to fuel, and long-term trends. Among other findings, the study reported that 42% of automobile waste oil becomes a probable pollutant (1% dumped in sewer, 18% fate unknown, and 23% dumped on ground) and 22% becomes a potential pollutant (11% road oil, 8% taken from state, and 2% farm use). Some 37% appeared to be reclaimed as fuel oil, more as lube oil.

Ash, David, "Used Motor Oil-Any Good?", Argosy, Vol.364, No. 4, April 1967.

The author presents a well-argued and well-researched commentary on some of the major institutional issues surrounding recycling of waste oil. He notes the resistance of the major oil companies to re-refiners and speculates on economic motives that might induce such resistance. Examples of major fleets using re-refined oil are provided and the difficulties of oil disposal alternatives to re-refining are described. The author cites testimonials for recycled oil by lube experts, briefly reports the technical problems encountered in re-refining, and evaluates two major critiques of recycled oil. He rejects the allegation that lube oil wears out but at least partially accepts the idea that the quality of re-refined service station waste oil can vary widely. He suggests the buyer look for the APR emblem label.

Barclay and Company, Inc., Barclay Waste Oil Burner, Product Bulletin, New York.

The process described will incinerate waste oil.

Bernard, Harold, "Embroiled in Oil", EPA, Agriculture and Marine Pollution Control Branch, Division of Applied Sciences and Technology, reprinted in the Proceedings of the Joint EPA-API Conference on Prevention and Control of Oil Spills, Washington, D.C., June 15-17, 1971, pp. 91-96.

This oft-quoted paper on waste oil disposal discusses the fate of used automotive crankcase oil and concludes that about 500 million gallons each year go into the environment. Burning tests produce mixed results; although some tests showed 3 to 1 dilution with virgin fuel would be adequate, other tests showed burner clogging. The vacuum distillation experience of NORCO (g.v.) was presented. The paper does not go into detail in any one area, but it raises many of the important issues in waste oil disposal.

Bethea, S. R., et.al., A Modern Technique for Automotive Waste Oil Re-Refining - Distillation Plus Hydrotreating submitted for Publication in HPI.

Bonnifay, Pierre and Durtiau, Robert, A New Process for Reclaiming Spent Lubricating Oils, Institute Français du Petrole, New York, New York, September 1972, also published as Report No. F&L-72-51, National Petroleum Re-Refiners Association, September 1972.

A process developed by the French Petroleum Institute is described for propane clarification of spent lube oils prior to conventional acid/clay treating. The IFP process lowers but does not eliminate the amounts of acid and clay needed, improves oxidative stability of reclaimed oil, and lowers ash content. The authors claim that product quality is constant, yields are higher, and plant investment is low. Technical information given is inadequate for experimental replication of the IFP process.

Booth, G. T., The Oil Company's Partner in Proper Service Station Waste Oil Disposal - The Collector and Re-Refiner, Paper # F&L-72-46, National Petroleum Refiners Association, Washington, D.C., September 1972.

Booth reports a study showing that manufacturers of second and third grade lube oils sometimes abuse the API/SAE quality rating system. He also reports a Bureau of Mines plan to establish regional waste oil collection centers nationwide to provide recycled oil for federal purchase.

Bowen, D.H. Michael, "Waste Lube Oil Pose Disposal Dilemma", Environmental Science and Technology, Vol. 6, No. 1, p. 25, American Chemical Society, Washington, D.C., January 1972.

The article reviews much of the waste oil research carried on up to publication date. It concludes that reprocessing may be the best answer but that the new technology required would add costs to an industry already under severe economic pressure. API and A.D. Little waste oil disposal surveys (q.v.) are summarized. Scavenger operations and obstacles to re-refining are indicated: tax burdens, increasing additives, and residual disposal. The NORCO and IFP processes for re-refining are discussed and the API's recommendation to use waste oil for fuel is reviewed.

Bunker, John, "From Pollutant to Resource", Christian Science Monitor, July 25, 1973.

Standard data on waste oil generation and on EPA research efforts is given. Although a generally accurate overview, some assertions are questionable.

Burhenne, W.E. and Irwin, W.A., "A Model Waste Oil Disposal Program in The Federal Republic of Germany," Ecology Law Quarterly, School of Law, University of California, Berkeley, California, Vol. 1, No. 3, Summer 1971.

The article is a detailed description of the 1968 Waste Oil Law in West Germany. The law established a complicated, but nonetheless effective, bureaucratic and economic structure to regulate disposal of waste oil. The government taxes all oil brought into the country and then uses these funds to support a subsidy incentive system for proper disposal of waste oil. A small payment is allowed for incineration, a larger sum for use as fuel oil, and an even larger sum for re-refining to lube oil. The authors note some of the law's defects, suggest improvements, compare the actions of other European countries, and comment on the dangers of arbitrary disposal of waste oil to the environment.

Bylinski, Gene, "Metallic Menaces in the Environment," Fortune, January 1971.

The dangers of metals as non-degradable pollutants is discussed. Expected federal restrictions on metallic pollutants can be expected to hinder plans to dispose of waste oil by burning it as fuel.

Byrne, J., Presentation of the API Committee on Disposal of Waste Products; National Petroleum Refiners Association 1972 Fuels and Lubricants Meeting, New York, New York, September 14, 1972.

"California Project Turning Sump to Soil," Oil and Gas Journal, 58, September 11, 1972.

Christiansen, F.A., Clingan, W.W., Hartmann, L.M., Engines Like Ashless Detergents, Society of Automotive Engineers, June 1962.

Commander, J.C., Nonradioactive Waste Oil Disposal Study, Idaho Nuclear Corporation, prepared for U.S.AEC, Idaho Operations Office, under contract No. AT(10-1)-1230, Idaho, February 1971.

The report reviews applicable regulations and standards, estimates the volume and character of waste oil generated, describes collection and storage techniques, and discusses disposal alternatives. Cost trade-off studies and environmental impact statements are included. The analysis concludes that commercial reclamation is economically unattractive due to disadvantageous tax and labeling laws and that waste oil should be used for surface treatment of unpaved roads.

Conner, Michael J., "Project of a Small New Jersey Company Could Cut Oil Pollution of U. S. Waters," Wall Street Journal, February 7, 1973, p. 10.

EPA's research at the National Oil Recovery Corporation (NORCO) is discussed. The article gives economics and production data on the firm and comments on the decline of the re-refining industry. It describes EPA's major financial support for NORCO, implies that the results of the first phase were not what was hoped for. However, it quotes rosy predictions of future successes made by both the firm's owners and by EPA officials.

Cornell, Howland, Hayes and Merryfield, Seattle Area Oil Waste Disposal Facility Study, Seattle, Washington, August 1969.

Crittenden, A.M., Re-Refining Lubricating Oils for Railroads, American Society of Lubricating Engineers 15th Annual Meeting, Cincinnati, Ohio, April 1960.

Cruikshank, Major Charles B., Oil Re-Refining--Its Importance to the USAF Economy, Research paper submitted to the faculty of the Air Command and Staff School of the Air University, Historical Research Center, Maxwell AFB, Alabama, October 1949.

"Current Developments", Environmental Reporter, Vol. 2, Nos. 1, 40, 43, 50, Bureau of National Affairs, May 1, 1971 - April 30, 1972.

Miscellaneous Congressional and Administration actions on waste oil are reported.

Cutler, Edward Taylor, "Reusing Oil", Environment, Vol. 14, No. 3, p.55, a letter to the editors, April 1972.

The letter comments on the A.D. Little and API waste oil reports (q.v.) and suggests that re-refining to lube oil is too difficult while blending for fuel oil is too polluting. Instead he argues for reprocessing used oil to fuel oil using a new method developed by the author's firm, Pilot Research and Development Corp., Merion Station, Pennsylvania.

Delos, J.W., Techniques of Waste Oil Handling - Automotive Operations, 24th ASLE Annual Meeting, Philadelphia, Pa., May 1969.

Delsky, Richard, "Oil Pollution In Sewers?" New York Post, December 26, 1970.

Commissioner of Water Resources, Maurice Feldman, says gas stations probably will have to begin accounting for all their used oil. The possibility of oil build-up and explosions in the sewers is reported. See also, "Gas Stations Found Dumping Waste Oil in Sewer Systems," loc. cit.

Dotson, D., et al., Land Spreading; A Conserving and Non-Polluting Method of Disposing of Oil Wastes, August 1970.

Ebrey, G.O., "Re-Refining of Used Mineral Oils by Treatment with Activated Clay and Heat," Lubrication Engineering, December 1950.

Environmental Law Institute, "The Legal Aspects to Incentive Approach to Pollution Control", EPA Contract No. 68-01-2203, Washington, D.C., June 28, 1973.

The contract provides $60,000, a part of which will be devoted to study of alternative federal policies on waste oil control.

Environmental Quality Systems, Inc., Waste Oil Recovery Practices State of the Art, (1972), prepared for State of Maryland, Maryland Environmental Service and U.S. Environmental Protection Agency, Washington, D.C., December 1972.

This report completes the first objective described in the MES grant application to EPA (q.v.). Although there are some errors, it is the best data compilation on this issue now available. Its chapters cover these issues: sources and amounts of waste oils in Maryland, national waste oil projections, physical and chemical characteristics of waste oils, present versus future oil characteristics, properties of recovered products, trends in oil use, survey of existing laws and regulations, lube oil base stocks, physical and chemical processes for re-refining waste oils, review of patent literature, direct and indirect waste oil disposal techniques. There is a good technical bibiography of the report, p. 169.

Esso Research and Engineering Company, POL Disposal Techniques, U.S. Air Force Contract No. F29601-73-c-0047, Linden, New Jersey, January 23, 1973.

The contract is for $39,000 and calls for Esso to perform a paper study of alternative techniques that the Air Force might use in disposing of waste petroleum, oils, and lubricants (POL's).

Esso Research and Engineering Company, Research on Oily Wastes, by R.H. Salvesan et. al., Government Research Laboratory, prepared under contract No. N00600-72-C-0761 for the U.S. Navy, Naval Supply Systems Command, R&D Branch, Final reports due June 25, 1973.

Nine reports on major Navy Terminal complexes describe systems for collection and use of oily wastes as fuel.

Esso Research and Engineering Company, Waste Oil Reprocessing, by Gilford A. Chappell, Government Research Laboratory, Project 72-5, prepared for the Division of Water Pollution Control, Water Resources Commission, Commonwealth of Massachusetts, January 1973.

Esso studied the technical problems of using waste oil as fuel oil for Massachusetts. It performed combustion tests, precipitation tests, and distillation experiments. The combustion trials showed severe fouling of the heat exchange tubes. Sludge precipitation was less effective than distillation in removing metals but offered fewer problems in residual disposal.

"Fact Book," National Petroleum News, Mid-May 1972, p. 136.

Farrington, John W. and Quinn, James G., "Petroleum Hydrocarbons and Fatty Acids in Sewage Effluents," Woods Hole Oceanographic Institution Contribution No. 2812.

Fritsch, Albert J., "Waste Oil Disposal: Time for Change," Environmental Action, January 20, 1973, p. 3-5.

This article presents fresh information on waste oil disposal alternatives. It discusses metallic contaminants in waste oil, describes military attitudes toward recycled oil, and mentions Sweden's recycling program. A two-fold mechanism is suggested to resolve waste oil problems: 1) a means of collecting, storing, and reprocessing waste oil and 2) incentives and regulations to deal with individual consumers. A federal subsidy program is recommended.

GCA Corporation, A Study of the Economic,Technical, and Environmental Factors Affecting Reuse of Waste Oil as a Blended Fuel Oil, EPA Contract No. 68-01-1859, May 17, 1973.

The contract specifies that GCA will focus on use of waste oil as a fuel for power plants.

GCA Corporation, Study of Waste Automotive Lubricating Oil as an Auxiliary Fuel to Improve the Municipal Incineration Combustion Process, Environmental Protection Agency Contract No. 68-01-0186, EPA Contracts Management Division, Washington Contract Operations, April 19, 1972.

The contract report concludes that the physical and chemical properties of automotive waste oil make it suitable as an auxiliary fuel in municipal incinerators. It is found to reduce combustible air pollutants and excessive residues that result from the burning of wet or low heat value refuse.

Gallapoulos, N. E., Projected Lubricant Requirements of Engines Operating with Lead Free Gasoline, Society of Automotive Engineers, June 1971.

"Gas Stations Found Dumping Waste Oil in Sewer System", New York Times, December 26, 1970.

EPA's investigation into waste oil dumping by service stations is reported. Neil Fabricant, assistant administrator for legal services, threatened prosecution for such polluters. See also Loetterle, op. cit.

Gruse, W.A., Motor Oils, Performance and Evaluations, Reinhold Publishing Company, New York, 1967.

Goetsch, H.C., Address To: The Association of Petroleum Re-Refiners, St. Louis, Missouri, July 26, 1972.

The Vanik bill, HR 15502 (q.v.), is the occasion for the APR meeting and the topic of this paper. The author offers amendments to strengthen the bill: the labeling section should be replaced with a provision for a uniform classification section for lube oil quality; virgin oils should be taxed and the funds used to abate oil pollution, e.g., by developing ways to deal with re-refining wastes; and the federal government should develop understandable quality specifications for lube oil testing and educate consumers on how to buy oil.

Hartung, H. D., Economic Recovery of Waste Lubricating Oils, 30th International Water Conference of Engineers Society of Western Pennsylvania, Pittsburgh, October 28-30, 1969.

"HECO Waste Oil Burning Due for Pollution Ruling," Honolulu Advertiser, December 17, 1972.

Harvey, James, "General Motors Recycles Over Million Gallons of Waste Industrial Oils", Congressional Record, June 7, 1972, E6030-E6031.

Congressman Harvey of Michigan discusses the program of GM's Steering Gear Division to install a "closed loop" system for recycling more than one million gallons of industrial oils each year.

"Hawaii Utility Has Good Result Burning Waste Oil," Platt's Oilgram News Service, Vol. 50, No. 220, November 14, 1972.

"Hearing Scheduled on Waste Oil in Harbor," Argus-Citizen, Dorchester, Massachusetts, September 14, 1972.

Herschel, W.H., Anderson, A.H., "Reclamation of Used Petroleum Lubricating Oils," National Bureau of Standards Technological Papers, Vol. 17, No. 223, October 1922.

Humble Oil Company, "Lubetest DG-2C", Product Bulletin.

"Is Lube-Oil Reclaiming Being Abandoned Because of Economic Unfeasibility?" Oil and Gas Journal, December 13, 1971.

Jack, R. W., "Laboratory Engine Specification Test for Crankcase Oil - I", Lubrication, Vol. 55, No. 8, Texaco, Inc., New York, New York, 1969.

The background, purpose, and significance of most common crankcase lubricant specification engine tests are discussed, and a brief description of each test procedure is provided.

Jackson, Howard E., "Re-Refined Oil for Private Airplanes", Aero Magazine, Vol. 3, No. 3, May/June 1970.

The article claims that many private pilots, flying school operators, and mechanics prefer re-refined lube oil because it gives longer engine life at considerable savings. The evidence is personal rather than survey data, and most individuals are not adequately identified. The author argues that the oil is improved by being processed three times: in the original refining, in the engine, and by the re-refiner. Weaker parts of the oil are seen to be destroyed leaving lube oil superior to that originally sold. Favorable engine tests by Analysts, Inc. (Oakland, California) are reported. However, resistance to re-refined oil by major aviation fuel dealers because of variability of re-refined feedstocks is also indicated.

Kalichevsky, V.A., Modern Methods of Refining Lubricating Oils, Reinhold Publishing Company, New York. 1938.

Levine, Alan, The Recycling of Waste Oil, unpublished paper, Environmental Law Seminar, Georgetown University Law School, Mr. Fabrikant, December 21, 1972.

The paper reviews the generation of waste oil, the decline of the re-refining industry, views of the API, and the Vanik bill (q.v.)

Loetterle, Fred, "Use of Sewers for Oil Dumping Probed", New York Daily News, December 26, 1970.

The start of a New York City EPA investigation of gas stations' use of sewers for waste oil dumping is reported. The study was begun after the Metropolitan Waste Oil Dealers Association estimated that 20% of the city's service stations were illegally dumping. One year earlier, service stations had begun to pay for collection of waste oil they had previously been able to sell. Increased use of additives was blamed for the switch.

"Low Cost System Readies Waste Oil for Boilers", Power, August 1972.

The Carrier Corporation is using waste industrial lube oil as fuel oil at its plant in Syracuse, New York. Only settling to remove water is performed before burning. Carrier then blends this oil with No. 5 or No. 6 fuel oil in proportions up to 25%.

Lowther, H.V., Lube Effects with Unleaded Gasolines, API Proceedings, May 12-14, 1971, San Francisco, California.

Removal of lead from gasoline causes rusting of engine parts, and increases varnish deposits. Exhaust valve recession frequently occurs but the effect on oil oxidation and thickening is ambiguous.

"Lube Oil Refining Rebounds", Chemical Engineering, September 9, 1968, pp. 54-56.

Lubrizol Corporation, Fuel and Lubricant Test Capabilities, January 1972.

This loose-leaf binder contains descriptions and uses of the various engine tests used to evaluate lube oil.

Lubrizol Corporation, Modern Automotive Lubricants-1972, by P. A. Asseff.

This pamphlet gives a relatively non-technical description of types of vehicle lube oil and engine tests used to evaluate lube oil.

M/PF, Re-Refined Motor Oil - Market and Supply, M/PF Research Report No. 713-485C, August 1971.

This 15 page report for the Texas American Oil Company identifies quantities and major suppliers of used oil in the Ft. Worth-Houston Area and quantities and major purchaser of waste oil in the same area. It concludes that there is some opportunity for expansion of sales with different labeling approaches, e.g., use of the term, "recycled".

Mallatt, R.C., Grutsch, J.F., Simons, H.F., "Incinerate Sludge and Caustic", Hydrocarbon Processing, May 1970.

Maryland Environmental Service, Oil Recovery Program, Application for Environmental Protection Agency Research, Development and Demonstration Grant, State of Maryland, December 7, 1971.

MES received $140,000 to develop a comprehensive collection and treatment plan to solve the state's waste oil problems. The grant proposal states four objectives: 1) a state-of-the-art review of existing waste oil recovery technology, 2) a management program for waste oil collection and handling, 3) a financing plan, 4) preliminary engineering and preparation of plans for a state-wide waste oil recovery system. See also "Environmental Quality Systems, Inc.", op.cit.

Massachusetts Hazardous Waste Board, Hazardous Waste Regulations, Division of Water Pollution Control, Boston, Mass., Publication 6672, August 1972.

The regulations permit the Division to control collection and disposal activities through licensing of waste collection and disposal firms. The intent of the licensing is to promote reclaiming of wastes insofar as practical. Where this is not possible, incineration, neutralization or other processes eliminating the wastes from the environment are preferred. Where such alternate disposal is not available, selected sanitary landfill sites are being approved for sludge and solid wastes. Regulations promulgated under G.L. Chap. 21, secs. 52, 57, and 58.

McCrone Associates, Bibliographical Study of Re-Refining Used Lubricating Oil, by Richard E. Putscher, Project MA-1982, Oct. 9, 1970.

This work for the Association of Petroleum Re-Refiners updates the technical non-acid waste oil treatment bibliography prepared by R. E. Putscher for Armour in April 1961.

McCrone Associates, Study of Problems of Refining Lubricating Oil Drainings, Project MA-1982, May 11, 1971.

This short study for the Association of Petroleum Re-Refiners was funded in an effort to find technical means of dealing with recycling problems caused by the growing variety of additives and additive products found in waste oil. Two process problems were studied: the thermal effects of pre-distilling the oil prior to sulfuric acid treatment, and the nature of the materials causing filter press plugging. Half of the total research effort went into screening non-acid flocculents to precipitate these suspended materials in used oils.

McMahon, Thomas C., "Can the Waste Lube Oil Problem Be Solved?", Yankee Oilman, December 1972.

The Director of the Massachusetts Division of Water Pollution Control summarized the status of the Division's programs to abate waste lube oil problems. The author notes that re-refining firms operate under special burdens and that none now exist in New England. The state's research programs on treatment technology (Esso Research and Engineering), biological degradation (Tyco Laboratories), and statewide waste oil generation (A.D. Little) are reported. The author describes the state's new hazardous waste regulations and the state's joint plans with EPA to locate a waste oil collection facility at Braintree.

Millar, F. W., "Under the Hood," Chemistry, Vol. 44, No. 6, June 1971.

Modrock, E., "Treated Fuel Oil Reduces Deposit Build Up," Maintenance Engineers, 1970.

National Academy of Sciences and National Academy of Engineering, Water Quality Criteria 1972, prepared by the Committee on Water Quality Criteria, 1973.

National Academy of Sciences and National Academy of Engineering, Research Needs in Water Quality Criteria, Report of the Committee on Water Quality Criteria, Environmental Studies Board, 1973.

National Oil Recovery Corporation, "Conversion of Crankcase Waste Oil into Useful Products," EPA WPCR Series 15080 DBO, March 1971.

This EPA technical publication issued by the Office of Water Quality describes NORCO's progress in developing and demonstrating a simplified technique for reprocessing spent automobile crankcase oils. The objective was to produce useful non-lube petroleum products such as low sulfur fuel oil and diesel fuels, without producing residues which cause water pollution. The product goals specified were substantially achieved but the disposal of residual "bottoms" remained a problem. A $ Federal grant financed the research.

National Oil Recovery Corporation, Recycling of Waste Oils into Diesel Fuels and Other Petroleum Products, Environmental Protection Agency Contract No. 68-01-0177, EPA Contracts Management Division, R&D Procurement Section A, March 7, 1972.

The $352,000 contract calls for further work by NORCO. The objectives are to improve the quality of fuel oil produced, solve the "bottoms" residual problem, determine the quality of products, and obtain more systems design and operating data.

National Petroleum Refiners Association, A New Process for Reclaiming Spent Lubricating Oils, Report No. F & L-/2-51, September 1972.

"Oil on Troubled Waters", Government Executive, February 1970, p. 24.

A standard account of the waste oil problem, tax discrimination, and FTC labeling laws is provided.

"Oil Purification, Filtration and Reclamation," Lubrication, Vol. 33, No. 1, January 1947, p. 1-12.

Olcott, William, "Motor Oil Sales Flow from Stations to Mass Merchandisers," National Petroleum News, July 1971.

This article is the source of the frequently cited figure that the service stations'share of the 600 million gallon/year auto lube market has slipped from 70% in 1961 to about 45% today. Some 30% of new auto lube oil is now sold through mass marketers such as discount houses, and the percentage is expected to rise to 40% or more in the /0's. In addition, major suppliers who have traditionally shunned this market are increasingly selling directly to such distributors. Various other changes in the auto lube oil market are discussed: do-it-yourself oil changes, smaller cars, longer drain periods, increasing car numbers, improving oil quality, non-leaded gasoline, rise of multigrade oil, and the trend to racing oil.

Pollack, Jack M., "Change Your Oil, Mister?", True, June 1952.

This is an interesting expose of the prejudiced economic treatment accorded re-refined oil, even this long ago. Although the article is quite old, issues described are the same ones being fought today -- such as quality consistency and supposed bias on the part of major oil companies and the military.

Porcello, Joseph A., "Allied Used Up Old Auto Oil," Syracuse Herald American, January 1972.

Recon, Inc., Study to Obtain and Develop Information on Waste Oil Recycling, EPA Contract 68-01-1870, Princeton, New Jersey, March 1, 1973.

The contract calls for Recon to 1) assess waste oil disposal techniques, 2) evaluate existing technology for waste oil processing, 3) determine the environmental impacts of various processes, and 4) perform a national material balance on waste oil and recommend improvements.

"Recycled Fuel," Quincy Patriot Ledger, Quincy, Massachusetts, October 7, 1972.

"Refining of Motor Oils," Lubrication, December 1946.

Reitze, Arnold W. Jr., Environmental Law, Second Edition, "Lubricating Oil," by Jeffrey E. Howard and Dennis P. Koehler, J.D.'s the National Law Center, George Washington University, June 1972, p. 79.

This appendix to Chapter 2 provides a survey of waste lube oil disposal issues: air and water pollution, effect of retailing, and the recycling industry and its problems. Much of the information has been used in statements drafted for Congressman Charles A. Vanik (q.v.).

Rek. L., Combustion of Oil or Gas in Fluidized Beds, Proceedings 2nd International Conference on Fluidized Bed Combustion, Publication #AP-109, EPA.

Schilling, A., Motor Oils and Engine Lubrication, 2nd Ed., England, Scientific Publications Ltd., 1968.

"The Schuylkill Oil Swamp: Ecology Gone Haywire," The Philadelphia Inquirer, Philadelphia, Pa., July 10, 1972.

Seidl, H.C., "Evaluation of Reclaimed Oil," History HQ OCAMA, Oklahoma City, Oklahoma, FY 1948, Historical Research Center, Maxwell AFB, Alabama, July - December 1948.

Shell Oil Company, Notes of Disposal of Refinery Wastes by Biological Action in Soil, Deer Park, Texas.

Shields, Wilfred H. Jr., and Miles, Walter A., Used Oils - a Waste? or a Resource?, Solid Waste Services, Maryland Department of National Resources, and Division of Solid Waste Management, Maryland Department of Mental Health and Hygiene, April 1971.

This is a forthright report of the authors' personal study of waste oil disposal. It estimates the amounts and sources of waste oil discarded, describes the kinds of changes that result, and accuses the Federal government of bringing about the decline in recycling through unfavorable tax and labeling decisions. It strongly criticizes the API for underestimating the oil pollution problem. Finally, the report recommends that waste auto oil be recycled to lube oil, that waste industrial oil be used as fuel, and that the state establish a major system for recovery of waste oil. This last recommendation led to the current MES research with Environmental Quality Systems, Inc. (q.v.)

Smalheer, C.V., and Smith, Kennedy, Lubricant Additives, Lezius-Hiles Co., Cleveland, Ohio, 1967.

Lubrizol Corporation, a major additive manufacturer distributes this technical work on the chemistry and application of additives and the testing and evaluations of lubricants.

Society of Automotive Engineers, Crankcase Oil Viscosity Classification, J 300a April 1967, editorial change, October 1972.

The SAE specifies a recommended practice for classifying lube oils according to viscosity: 5W, 10W, and so forth.

Society of Automotive Engineers, Engine Oil Performance and Engine Service Classifications, J 183a, April 1971.

In this "Recommended Practice" document the SAE updates and promulgates engine lube oil catagories, SA through SE, and CA through CD. It gives API engine service descriptions, ASTM engine oil descriptions, and primary performance criteria for each catagory (grade).

Society of Automotive Engineers, Engine Tests for Evaluating Engine Oils, J 304a, June 1971.

In this "Information Report", the SAE describes some of the more widely used engine tests for evaluation of lubricants.

Society of Automotive Engineers, Physical and Chemical Properties of Crankcase Oils, J 357, August 1969, editorial change, June 1971.

This SAE "Information Report" discusses a number of the physical and chemical properties of new and used crankcase oils. Standardized test methods are also listed.

"Spectrum," Environment, January/February 1972, p. 26.

Summarizes article by Bowen, Environmental Science and Technology (q.v.).

"Squeezing Pure Lube from Waste Oils", Chemical Engineering, by B. Cross, June 11, 1962, pp. 126-128.

A process flowsheet is provided for the operations of Motor Oils Refining Co., a re-refiner in Illinois.

Streets, R.E., a letter to Mr. H. Paul Butz, Chief of the FTC's Division of Trade Regulation Rules, File 959, June 5, 1964.

Streets, the Chief of the Army Material Command's Power Sources Section, writes to support the FTC's proposed Trade Regulation Rule (q.v.). He states that the variability in the charge stock makes adequate process control in re-refining impossible and that earlier engine tests have shown available re-refined oils to be very inferior. Streets also indicates that control specifications proposed by the re-refiners would not be adequate to assure quality and that routine performance tests using actual equipment are the only real guarantee of high quality.

Supta, N.P. and Gairola, V.K. "Use of Waste Engine Oil as Fuel," Chemical Engineering World, Vol. 7, No. 6, June 1972.

Swain, J.W., Disposal of Spent Industrial Lubricants, Paper #FL-72-4T, September 1972, National Petroleum Refiners Association, Washington, D.C.

This seven page non-technical commentary briefly surveys disposal alternatives for industrial lubricants. The author concludes that disposal can be improved if the oil user reduces his usage and separates types of waste oil during collection. He recommends reprocessing for use as lubricants, metal working fluids, or fuel.

Swain, John W., Jr., Reclaiming, Re-Refining, and Uses of Waste Oil, American Society of Lubrication Engineers, Annual Meeting, Chicago, Illinois, April 29, 1973.

The disposal alternatives for waste industrial and crankcase oils is discussed. Contaminants in both types are enumerated. The paper describes provisions of several new Michigan laws which require industries to report on their waste generation, which license and control waste oil scavengers, and which permit citizen suits against polluters. Purchase, collection, mixing, reprocessing and product alternatives for used oils are reviewed.

"Swarf Crushing and Oil Reclamation Plant," Environmental Science and Technology, September 22, 1967, p. 387.

Teknekron, Inc. "Technical and Economic Study of Waste Oil Recovery", EPA Contract No. 68-01-1806, Berkeley, California, March 26, 1973.

This contract for $58,000 calls for Teknekron and its subcontractor, The Institute of Public Administration, to investigate the feasibility of closed-loop oil recycling systems, the economics of the re-refining industry, consumer waste oil disposal, and federal research efforts in waste auto lube oil disposal.

Thurmond, Strom, "The Need for Recycling of Oil", Congressional Record, January 16, 1973, p. S66.

Remarks were made on the introduction of S 409, a bill to amend the excise tax code to encourage reuse of waste oil. Thurmond discusses the generation of waste oil, its environmental impact, and federal obstacles to recycling.

Tyco Laboratories, Biological Degradation of Waste Oil Sludge, contract report for Massachusetts Water Resources Commission, 1971.

U.S. Congress, 93rd, 1st Session, HR 5902: National Oil Recycling Act, a Bill to Provide for the Recycling of Used Oil and for Other Purposes, House Committee on Ways and Means, introducted March 20, 1973 by Charles P. Vanik (D-Ohio).

Identical bill to Vanik's bill, HR 15502, introduced June 14, 1972.

U.S. Congress, 93rd, 1st Session, S 409,"A Bill to Amend the Internal Revenue Code of 1959 to Encourage the Use of Recycled Oil", Senate Finance Committee, introduced January 16, 1973, by Strom Thurmond (R-S.C.).

This bill is identical to a bill introduced March 21, 1972 with remarks by Senator Thurmond (q.v.). It and a bill by Congressman Vigarito (q.v.) are identical to the bill Congressman Vanik first introduced in January 1972. All these measures would allow re-refiners to be exempted from payment of excise taxes on virgin oil that they blend with their re-refined oil.

U.S. Congress, 92nd, 2nd Session, HR 15502: Natural Oil Recycling Act, a Bill to Provide for the Recycling of Used Oil and for Other Purposes, House Committee on Ways and Means, introduced June 14, 1972 by Charles A. Vanik (D-Ohio).

A major provision of the bill would reform the excise tax treatment of lubricating oils by abolishing the current tax exemption enjoyed by virgin lube oil that is not used in highway vehicles. The bill would also change the labeling requirements for re-refined oil imposed by the Federal Trade Commission, prohibit oil companies from restricting their service stations from selling recycled oil, encourage Federal procurement of recycled oil, and force all lube oil retailers to provide disposal facilities and to sell oil only in returnable containers.

U.S. Congress, 92nd, 2nd Session, House Ways and Means Committee, Subcommittee on Natural Resources, March 20 and 21, 1972.

A statement of Belton Williams, President of the Association of Petroleum Re-Refiners, asks for restitution of the 6¢/gallon excise tax on virgin industrial oil. He supports S 409 by Senator Thurmond.

U.S. Congress, 92nd, 1st Session, Joint Economics Subcommittee on Fiscal Policy, The Economics of Recycling Waste Materials, Hearings, November 8 and 9, 1971, esp. p. 179.

Witnesses testified from the National Association of Secondary Materials (NASMI), the American Paper Institute, the National Commission on Materials Policy, New York EPA, Resources for the Future, and the U.S. EPA. The Association of Petroleum Re-Refiners (APR) submitted a statement decrying the pollution damage of waste oil and the pollution hazards of burning it. The APR further asked for statutory changes in the excise tax treatment of lubricants, including a new provision allowing re-refiners to collect a refund on virgin oil purchased for blending.

U.S. Congress, 90th, 1st Session, Senate Public Works Subcommittee on Air and Water Pollution, Water Pollution - 1967 (Part 1), Hearings on S1591 and S1604, June 7, 8, and 9, 1967.

Hearings chaired by J. Caleb Boggs (R-Del.) examined the automotive oil pollution problems arising from the Excise Tax Reduction Act of 1965. Testifying were James M. Quigley, Commissioner of the Federal Water Pollution Control Administration; Harold L. Jacobs, Vice Chairman, Delaware Water and Air Resources Commission; Alfred E. Peloquin, Executive Secretary, New England Interstate Water Pollution Control Commission; P.N. Gammelgard, Vice President, Conservation and Manufacturing, American Petroleum Institute; and H.K. Robertson, President, Association of Petroleum Re-Refiners, accompanied by V.I. Worthington, Executive Director. The API produced survey figures to show that service stations are adequately serviced by waste oil collections. The APR showed increasing economic failures among its member firms and argued that Federal tax and labeling requirements were to blame.

U.S. Congress, 89th, 1st Session, Senate, Excise Tax Reduction Act of 1965, Report No. 324, to accompy HR 8371, Committee on Finance, June 14, 1965.

The Senate disagreed with lube oil excise tax reductions prepared both by President Johnson and the House on the grounds that the tax was needed to keep the re-refiners alive. It also removed the House provision that assigned lube oil taxes to the Highway Trust Fund.

U.S. Congress, 89th, 1st Session, House, Excise Tax Reduction Act of 1965, Report No. 433, to accompany HR 8371, Committee on Ways and Means, May 28, 1965.

President Johnson's bill would have repealed all excise taxes on lube oils. The House agreed to drop the tax on off-highway uses (through a refund procedure) but kept the tax on highway oil on the grounds that 1) the Highway Trust Fund was in need of more revenue and 2) that some tax advantage was needed to keep the re-refining industry alive.

U.S. Department of Commerce, Letter Circular LC-990, National Bureau of Standards, August 1950.

The three-page report concludes that the quality of re-refined oil depends on the quality of new oils from which it is obtained, the extent of deterioration, and the re-refining process. No performance test data is given.

U.S. Department of Commerce, "Sales of Lubricating and Industrial Oils and Greases, 1969," Bureau of the Census, Current Industrial Reports, Series MA-29C (69)-1, January 7, 1971, and MH-29C(71)-1, October 1972.

U.S. Department of Commerce, "Sales of Lubricating and Industrial Oils and Greases, 1967," Bureau of the Census, Current Industrial Reports, November 21, 1968.

U.S. Department of Commerce, "Sales of Lubricating and Industrial Oils and Greases, 1965," Bureau of the Census, Current Industrial Reports, September 7, 1966.

U.S. Department of Commerce, "Sales of Lubricating and Industrial Oils and Greases, 1965," Bureau of the Census, Current Industrial Reports, September 7, 1965.

U.S. Department of Commerce, "Sales of Lubricating and Industrial Oils and Greases, 1962, Bureau of the Census, Current Industrial Reports, October 14, 1963.

U.S. Department of the Interior, Additives in Re-Refined Oils by Atomic Absorption, study conducted by the Bureau of Mines, Bartlesville Energy Research Center, concerning metal content of some re-refined oils, February 22, 1972.

U.S. Department of the Interior, The Cost of Clean Water and Its Economic Impact, Vol. 1 of FWPCA Reports of 1968 and 1969.

U.S. Department of the Interior, The Cost of Clean Water, Petroleum Refining, Vol. III, Industrial Waste Profile No. 5, FWPCA Publication No. I.W.P.-5.

U.S. Department of the Interior, An Issue Support Paper About.... Waste Oil Recycling, Bureau of Mines, April 1972.

An extensive five year research effort to develop and demonstrate methods of waste oil re-refining is proposed. The program is to use the technical facilities at the Bureau's Bartlesville Energy Research Center in Oklahoma.

U.S. Department of the Interior, Petrochemical Plant Effluent Treatment Practices, FWPCA Report 12020, February 1970.

U.S. Department of the Interior, Water Quality Criteria, Report of the National Technical Advisory Committee to the Secretary, FWPCA, 1968.

U.S. Department of the Interior and U.S. Department of Transportation, Oil Pollution, A Report to the President, February 1968.

The ocean pollution impact of oil spills and other hazardous substances is emphasized. Waste oils from gasoline service stations is mentioned as an important source for the first time.

U.S. Department of the Treasury, Section 4091 - Imposition of Tax, Reserve Ruling 57-204, p. 371.

The Treasury ruled that the introduction of used oil into the process of refining virgin crude oil does not thereby make the product "a mere blend or mixture" of mixable and non-taxable oils that is tax exempt under section 314.40 (d) (3) of Regulations 44.

U.S. Department of the Treasury, Section 6424 - Lubricating Oil Not Used in Highway Motor Vehicles, Reserve Ruling 68-108, p. 561.

The Treasury Department ruled on two issues. It decided that re-refiners do not qualify as off-highway users and therefore are ineligible for a tax refund on virgin oil purchased for blending. It also decided that industrial buyers of blended re-refined lube oil could not collect a refund either since the product purchased is nontaxable.

U.S. Environmental Protection Agency, The Impact of Oily Materials on Activated Sludge System, Hydroscience, Inc., EPA Report No. 12050 DSH 03/71, 1971.

The 110 page report studied the effect of a variety of compounds on small scale continuous activated sludge systems. Batch studies to determine biodegradability and the effect of emulsification and temperature on the rate of biological reaction were also conducted.

U.S. Environmental Protection Agency, Ocean Disposal of Barge Delivered Liquid and Solid Waste from U.S. Coastal Cities, EPA Publication No. SW-19c, 1971.

This 119 page report by the Dillingham Corporation provides a baseline survey of ocean waste disposal. Included is a discussion of current marine disposal operations, environmental effects of barging wastes to sea, monitoring of marine waste disposal operations, and institutional factors and recommendations. Some passing references are made to the role of waste oil.

U.S. Environmental Protection Agency, Oily Waste Disposal by Soil Cultivation Process, Office of Research and Monitoring, EPA-R2-72-110, December 1972.

The study in Deer Park, Texas, showed that soil microorganisms can decompose oily wastes in landfills. The rate of decomposition was about one half pound per cubic foot of soil each month without fertilizers, double with fertilizers.

U.S. Environmental Protection Agency, Run off of Oils from Rural Roads Treated to Suppress Dust, EPA Report EPA-R2-72-054, October 1972.

The study indicates that some seventy percent of the oil leaves the roadway on dust particles or in water runoff. Most of the remaining thirty percent volatilizes and is biodegraded.

U.S. Environmental Protection Agency, Waste Oil Study, Preliminary Report to Congress, April 1973.

This report fulfills the 6 month report requirements of section 104(m) of the Federal Water Pollution Control Act Amendments of 1972. It covers quantities of waste oil separated, physical and chemical characteristics of waste oils, present methods of collection and disposal, biological effects of waste oil, and economic and legal aspects of waste oil policy. The report includes little

information on long-term biological effects, economics of reprocessing, disposition of home users, research efforts by other federal agencies, or institutional/policy factors.

U.S. Executive Office of the President, "Petroleum Refineries," The Economic Impact of Pollution Control, Council on Environmental Quality, Department of Commerce, Environmental Protection Agency, March 1972, pp. 263-73.

U.S. Federal Trade Commission, In Re Double Eagle Refining Co., 54 FTC 1035 (1958).

In its original early decisions, the FTC ruled that Double Eagle and other lube oil re-refiners must 1) not represent, contrary to fact, that its lube oil is refined other than from previously used oil and 2) not advertise its products without disclosing prior use of the oil to the purchaser, including "a clear and conspicuous statement to that effect on the container."

U.S. Federal Trade Commission, In Re Double Eagle Lubricants, 66 FTC 1039 (1964).

In its later decisions on labeling of re-refined lube oil, the FTC argued that disclosure of prior use had to be on the "front panel or front panels of the container." The decision imposed no new restrictions on the use of the word, "re-refined". The FTC claimed that its decisions were made without regard to the quality of the respondents' lube oil product.

U.S. Federal Trade Commission, a letter of Congressman Charles A. Vanik regarding waste oil, by Miles W. Kirkpatrick, Chairman, August 19, 1971.

Chairman Kirkpatrick explains that the FTC's Trade Regulation Rule on re-refined lube oil (q.v.) is not premised on the quality of such oil, but on the public's preference for virgin oil. However, he proceeds to acknowledge that, based on many submissions, the FTC believes re-refined oil to be of inferior quality and that the labeling rule would be reconsidered if valid evidence showed that it could compete in quality with virgin oil.

U.S. Federal Trade Commission, Trade Regulation Rule Relating Deceptive Advertising and Labeling of Previously Used Lubricating Oil, effective September 1, 1965.

The FTC labeling rule repeated the regulation announced in In Re Double Eagle Lubricants (q.v.) but also required clear disclosure of "Previous Use" and restricted the use of the word "re-refined". The Trade Regulation Rule can be found at 16 CFR 406.

U.S. Statutes, 89th, 1st Session, Excise Tax Reduction Act of 1965, Vol. 79, Public Law 89-44, June 21, 1965, p. 136 ff.

Title II, Manufacturers Excise Tax, imposes a six-cent-a-gallon tax on lube oils (sec. 4091 of the Internal Revenue Code of 1954) and then sets up a tax refund procedure for lube oil used for off-highway purposes (sec. 6424). The law's provisions and associated Treasury regulations can be found at 26 CFR 48.4091 and 26 CFR 48.4218.

"Used Lube Oil... oh just throw it away," U.S. Oil Week, January 1971, p. 3.

Some new information is added to a review of points made in Bernard and the API Final Report (q.v.). A New York City survey of service station waste oil disposal is discussed. The Wisconsin Petroleum Association reports that waste oils foul sewage treatment plants. The Nebraska Petroleum Marketers Association reports that a survey of state jobbers shows collection costs up to 10¢ a gallon and one third the jobbers supplying farmers who use waste oil for dust control, hog oiling, tank heaters, and weed control.

"Used Lube Oil Present a Slippery Problem," Rodale's Environmental Action Bulletin, Vol. 9, No. 6, April 17, 1971.

Points made in "Used Lube Oil", U.S. Oil Week, (q.v.) are repeated. In addition, the article suggests that readers patronize only service stations with adequate waste oil collection and that they write to the API, the APR, and the FTC about the need for better ways to dispose of waste oil.

Vanik, Charles A., "Natural Oil Recycling Act," Congressional Record, June 14, 1972, E6208-E6210.

Vanik comments on his bill, HR 15502, introduced the same day. He discusses waste oil generation, water pollution, air pollution, mass marketing of auto lube oil, and impediments to economic recycling operations. Finally, he describes the provisions of his bill.

Vanik, Charles A., "Oil Recycling," Congressional Record, December 2, 1971, E 12927-E12929.

Vanik makes points repeated in later Congressional Record remarks. He proposes to allow re-refiners to label their product "recycled oil" and introduces a bill, HR 12015, which would make re-refiners eligible for the off-highway six-cents-a-gallon tax refund.

Vanik, Charles A. "Oil Recycling Act of 1973", Congressional Record, March 14, 1973, E 1543-E 1545.

Vanik comments upon his bill, HR 5902, introduced March 20, 1973. He repeats many of the points he made upon the introduction of an identical bill in 1972, but drops the description of the bill's provisions and adds some data on waste oil generation and on fuel oil shortages.

Villanova University, Final Progress Report on Water Pollution Control Demonstration Project Grant No. WPD-174-01-67, submitted to Federal Water Pollution Control Administration, 1968.

A re-refining process using dehydration and caustic treating is described. The process uses less acid than traditional methods and reduces acid sludge disposal problems. There is, however, some question about the economic feasibility of the process.

Wadt, W.F., The Outlook for Lubricating Oils, Enjay Chemical Co., March 1971.

Walter C. McCrone Associates, Inc: Pounds of Combustion Products Per 10,000 Gallons of Drainings, Chicago, Ill., July 15, 1970.

A chart frequently circulated by the Association of Petroleum Re-Refiners shows that 1,000 pounds of metal oxide wastes are released when 10,000 gallons of waste motor oils are burned. Fourteen different metals were found in the residue, a large portion of which would normally occur as air pollution.

"What Price Lube-Oil Reclaiming?" Oil and Gas Journal, April 26, 1954.

"What to Do with Drained Oil," National Petroleum News, November 1970, p. 6.

API's Final Report of the Task Force on Used Oil Disposal (q.v.) is summarized.

Wiley, Morris A.,"Environmental Aspects of the Oil Spill Problem", Paper No. 1661, Environmental Protection Department, Texaco, Inc., June 1972.

Wisconsin Department of Natural Resources, Drain Oil Disposal in Wisconsin, Technical Bulletin No. 63, Madison, Wisconsin, 1973.

A survey of service station drain oil disposal was carried out by petroleum inspectors of the Department of Resources in 1971. The results indicate that service stations handle from 55 to 65 percent of the oil drained from crankcases

in Wisconsin. Of this, 97.6 percent is reused, and 2.4 percent wasted.

Worthington, Vernon T., Despite Talk of Recycling, Government Still Discriminates Against Recycling of Lubricating Oil..., Association of Petroleum Re-Refiners, N.D.

The memorandum emphatically proclaims the APR's complaints to the President, Congress, FTC, and pollution control agencies. It cites figures and statements on environmental damage, economic obstacles, and the pollution dangers of burning. An adequate profit margin is requested but no particular program of changes is advocated. Quoted in toto in U.S. Congress, Economics of Recycling Waste Materials, (q.v.).

Zeldin, Marvin, "Audubon Black Paper #1 - Oil Pollution," Audubon Magazine, May 1971.